charges made by the Western Electric Company for its equipment engineering specifications and for installing central office equipment in plants of the various Bell associate companies and with what such charges included from time to time.

I am familiar with sheet 2 of Defendants' Exhibit X-13, which attempts to make a comparison between the equipment engineering and installation prices of both manual and dial equipment used by Mr. Sloan in his appraisals and with certain indices taken from an index number study of Mr. R. W. Burgess. I heard Mr. Sloan's testimony in this connection as to how he had figured his installation cost in connection with manual and dial equipment in Chicago.

I furnished to Mr. R. W. Burgess, the Chief Statistician of the Western Electric Company, the material which he used in compiling his index numbers so far as installation and equipment specifications prices are concerned. The index numbers, which I furnished, reflected the trend of prices of that work for the Bell associate companies.

During the period under consideration, 1923 to 1931, there has been a gradual transfer of installation work from the field to the factory which has contributed substantially to reducing the installation prices as reflected in the Burgess trend. This transfer of installation labor from field to factory has affected both manual and panel installations, but it has affected the panel installation to a greater extent than the manual.

In the earlier panel installations, such as State-Central and Superior offices in Chicago, it was the practice at the shop to perform only a minor test on the wired equipment. It was then necessary for the installer to perform a detailed operation test on the equipment, involving considerable installation labor, and also the use of expensive equipment. On the later jobs the shop performs this detail operation test, thereby insuring that the equipment was in operating [fol. 7065] condition when it was shipped, and this has provided a very much more accurate test of the complicated circuits involved. It was then necessary for the installers only to perform a simple inexpensive routine test on the equipment to insure that no defects had developed during transit or installation. That resulted in lower installation cost in the field and, probably, higher material cost in the factory.

On the earliest jobs, the shop only assembled and wired the equipment on the selector frames, leaving to the installer the job of assembling and wiring this equipment on the sender and test frames.

In our earlier panel jobs, such as State-Central and Superior, it was necessary for the installer to perform the cabling and connect all of the apparatus mounted on the relay rack. He also performed an operation test to insure that the equipment functioned satisfactorily. To a very large extent this apparatus is now mounted on the relay rack units in the shop. It is there given an operation test, thereby insuring that it is in operative condition when it is shipped. It is then necessary for the installer only to connect the cabling to the terminal strips at the top of the unit, and perform a minor routine test to insure its functioning satisfactorily.

In arriving at my price trends for internal uses and in determining reductions made in installation prices, I dealt with this situation just as I found it except to exclude the effect of design changes. The Burgess index numbers, so far as installation prices and equipment engineering specifications are concerned, in no way indicate anything to the contrary of what I have just said.

With respect to the installation prices on manual central office equipment, there have been factors which affected reduction of such costs in one or more types of such equipment more than in others. The Number 1 Western Electric Company switchboard was introduced into general use at least twenty years prior to the beginning of this period under consideration. By 1923 the installation work on this equip-
[fol. 7066] ment had reached a high degree of efficiency, and very little improvement in that efficiency was made after that time, affecting installation prices. On the other hand, the Number 11 switchboard was introduced during the early part of this period, and very considerable economies were made in the installation work on that equipment. Furthermore, there was a marked increase in efficiency in the repeater equipment. Both of these were included in the Burgess price trend studies.

The transfer of a portion of installation labor from field to factory has affected equipment engineering specification prices. It has had the effect of reducing the prices of equipment specifications, because it has permitted the Bell asso-

ciate companies to order the equipment in standardized units, thereby reducing the engineering effort and price. The conditions which brought about increased efficiency in installing the new Number 11 manual switchboard and manual repeater installations has affected our manual equipment engineering specifications price. The equipments referred to were comparatively new, and as time went on we were able to make considerable economies in the prices.

This transfer of a portion of installation labor from field to factory has been going on continuously during this period, but more actively during the middle years of the period. The trends shown on page 2 of Exhibit X-13 are not trends of comparable situations.

I doubt if all of the data and information necessary for a study to obtain a trend on a comparable basis with the Sloan appraisal for installation labor and equipment engineering prices, is available. It would be necessary to ascertain the prices of equipment specification and installation on a large number of manual and panel installations, and then apply the current price information to each of those installations for each of the subsequent years. It would take at least five men working continuously for a year, I would imagine, to prepare such a study. The Western Electric Company has never made such a study.

[fol. 7067] ALLEN G. HOYT, recalled as a witness on behalf of the plaintiff in rebuttal, having been previously duly sworn, further testified as follows:

Direct examination.

By Mr. Blackman:

June 30, 1932.

I am the same Mr. Hoyt who testified previously in this case. I have examined Defendants' Exhibits X-227 to X-259, inclusive.

"Q. Referring to the comparisons set up in Exhibits X-227, X-228 and X-229, in your opinion are those comparisons appropriate to prove anything of value in determining the fair rate of return to the American Telephone and Telegraph Company or the Illinois Bell?

"Mr. Goldstein: I object to the form of the question.

"Judge Wilkerson: The objecton is sustained. It is not for him to say whether they are valuable. He can criticize them, and give his opinion on the subject himself, but I do not think he can characterize them."

Those exhibits indicate the cost of certain bond financing, in the rate of return to the Bell System, as compared with the cost of bond financing for certain railroads and public utilities. The spread paid by the Bell System in its bond financing was relatively small, because it issued only high-grade bonds; that is, those rated Triple-A, or Double-A. In selling bonds of high quality, the selling resistance is low and therefore the bankers are able to underwrite issues on a relatively low margin, whereas lower-grade bonds are usually more difficult to sell; they usually require more expense in merchandising, and therefore require a higher margin of profit. Therefore the comparison in these exhibits is in my opinion of practically no significance.

"Mr. Goldstein: I move to strike out the answer, that it is of no significance.

"Judge Wilkerson: The objection is sustained. Strike [fol. 7068] out what he says about it being of no significance. That is for the Court. He can tell what the exhibit shows."

The average yield on a miscellaneous assortment of bonds, that is to say, rating from high down to a medium or low grade, would naturally be higher than the yield on an assortment of bonds confined to the high rating; that is to say, rated Double-A or Triple-A. In this comparison, the Double-A bonds and Triple-A bonds of the Bell System are compared not only with bonds of similar rating, but with bonds of all classes.

"Mr. Blackman: Now in your opinion, is the effect upon the value of the comparison of the matters which you have just stated?

"Mr. Adcock: We object to the question.

"Mr. Goldstein: It is not for this witness to say what value the exhibits have.

"Judge Wilkerson: If he is being examined as an expert, it is necessary to put to him a hypothetical question, which includes all of the elements. He may not give an opinion as an expert in which he assumes these facts about the Bell Companies, unless they are all incorporated——

"Mr. Blackman: He is only assuming——

"Judge Wilkerson (continuing): —in the question, because——

"Mr. Blackman: He is only assuming the facts which he has stated, and sees on the face of the exhibit.

"Judge Wilkerson: I sustain the objection to that.

"Mr. Blackman: Mr. Hoyt, in your opinion are the facts which are shown in the comparison which we have referred to, sufficient to furnish a proper basis for making the comparison?

"Mr. Goldstein: I object to the question on the same ground.

"Judge Wilkerson: Is that not the same thing again, in just another form?

"Mr. Blackman: It is a very customary form of interrogating a witness——

"Mr. Goldstein: Well——

[fol. 7069] "Mr. Blackman: —in matters of this kind. I cannot see how else you can really get at it.

"Judge Wilkerson: I do not think it is proper, but if you press the question, I will take his answer. I will not deprive you of a record. I will take it subject to the objection. I do not think it is proper, myself.

"Mr. Blackman: Well, then, I will withdraw it.

"Judge Wilkerson: There are several things—either this witness is being examined as an ordinary witness, or he is being examined as an expert.

"Mr. Blackman: Surely.

"Judge Wilkerson (continuing): Now, if he is being examined as an ordinary witness, he testifies to the facts about the Bell financing——

"Mr. Blackman: Yes.

"Judge Wilkerson: —and he testifies to the facts of the financing of these other companies.

"Mr. Blackman: Yes.

"Judge Wilkerson: Now, if he is testifying as an expert, the question should be so framed that you are not examining him at the same time as an ordinary witness——

"Mr. Blackman: No, sir.

"Judge Wilkerson: —while he is testifying as an expert.

"Mr. Blackman: I am examining him solely——

"Judge Wilkerson (continuing): So that if he is testifying as an expert——

"Mr. Blackman: I am examining him solely as an expert, and I am asking for his opinion as to the effect of the things he sees before him. Of course, you cannot put a hypothetical question in a matter of this kind, because there is no hypothesis; the thing is there, it is actual; and I am simply asking him whether those things give him as an expert enough information to determine anything.

"Judge Wilkerson: I will take his answer subject to the objection. What is your answer?

"The Witness: Will you just read that question to me again, please?

(Read by the Reporter.)

[fol. 7070] "Mr. Adcock: What facts?

"A. I think not.

"Mr. Goldstein: Yes, what facts?

"Mr. Blackman: He has just mentioned the facts.

"Judge Wilkerson: I am taking the answer in order that the record may be made here. I have told you what I think about it. Go on. Answer the question."

I think not because the classification of bonds into different ratings is not rigid. Because two bonds are rated Triple-A does not mean that they are identical in security, and would command identically the same price yield on the market. A very large number of bonds are rated Triple-A; naturally, some are better security—have better security than others. The comparison of Triple-A bonds of one corporation with the Triple-A bonds of another corporation proves little in my own opinion, unless all of the pertinent and relative facts regarding each security are available.

"Mr. Goldstein: I move to strike out the answer as not responsive to the question.

"Judge Wilkerson: The record will show your motion.

"Mr. Adcock: And also——

"Judge Wilkerson: The ruling is reserved—what is it?

"Mr. Adcock: —particularly the statement that it proves little, and what follows.

"Judge Wilkerson: Yes. The record will show your objection."

One of the comparisons I have referred to is a comparison between an indiscriminate lot of railroad and utility bonds ranging from Triple-A down to BAA.

"Q. And they are averaged and compared with the average of the Bell System bonds. In your opinion, is that a proper comparison to make?

"Mr. Goldstein: I object to the question.

"Judge Wilkerson: The record will show the objection, and the same ruling. Go ahead.

"A. I think the comparison has little bearing on the situation.

[fol. 7071] "Judge Wilkerson: Well, what situation now are you talking about?

"The Witness: On the question of determining what is a reasonable rate of return.

"Mr. Goldstein: That is a question of law.

"Judge Wilkerson: There are a good many things to be taken into consideration in determining a reasonable rate of return——

"Mr. Blackman: Does it have——

"Judge Wilkerson (continuing): —and it is conceivable now that a table made up on the basis of bonds of entirely different classes of Triple-A bonds might throw some light on the subject. But it does not seem to me that it is for this witness to tell the Court whether it throws any light or not.

"Mr. Goldstein: No.

"Mr. Blackman: He is only——

"Judge Wilkerson: However, I will take the answer. I was merely indicating to you——

"Mr. Blackman: Yes.

"Judge Wilkerson: —that I do not think the Court is bound by the opinion of this witness on this subject.

"Mr. Adcock: And we move to strike out the answer.

"Judge Wilkerson: But he can say, and he has said, that a table that is made up on a mixed basis like this, will show —or tables made up on that basis will show many results dependent upon the particular bonds which are included.

"Now, whether they throw any light on what the Court shall say in this case as to rate of return, is an entirely different question. It may be that the Court in arriving at or in determining what is a fair rate of return, on this kind of property, should compare this property with other

properties, and it may be something that may enter into arriving at a conclusion.

"Mr. Blackman: Yes, sir.

"Judge Wilkerson: But that goes to the question——

"Mr. Blackman: And all we are doing is giving the Court the benefit of this man's expert opinion.

[fol. 7072] "Judge Wilkerson: —as to whether it is material——

"Mr. Blackman: Yes, sir, as to whether——

"Judge Wilkerson: —as to whether it throws any light on the subject——

"Mr. Blackman: As to whether it is appropriate.

"Judge Wilkerson: —would seem to me not to be a matter for expert testimony.

"Mr. Blackman: All right, sir.

"Mr. Adcock: May we have the answer stricken out?

"Judge Wilkerson: Well, the motion shows—is shown on the record; the record shows your motion.

"Mr. Adcock: Very well.

"Judge Wilkerson: Go ahead. I will let you make a record on this, Mr. Blackman.

"Mr. Blackman: All right, sir.

"Judge Wilkerson: His answer will be received subject to the objection, and subject to the motion to strike it out.

"Mr. Blackman: All right.

"Mr. Adcock: And will the record be made in the nature of an offer of proof——

"Judge Wilkerson: No.

"Mr. Adcock: —in this respect.

"Judge Wilkerson: I will let him put the question to the witness.

"Mr. Adcock: And we object.

"Judge Wilkerson: And let you object, and let the record show your objection, and let the witness answer the question, and let the record show in each case your motion to strike.

"Mr. Adcock: Very well.

"Judge Wilkerson: So that it will all be before the Court when it comes down for final determination. I think that is the quickest way to get it.

"Mr. Adcock: Very well.

"Mr. Blackman: Now, Mr. Hoyt, in Defendants' Exhibit X-236, comparison is made of Bell System bonds of certain

grades with bonds of corresponding grades of railroads, public utilities, and industrial companies. In your opinion, [fol. 7073] does that comparison furnish any basis for determining relative marketability of the bonds dealt with?

"Mr. Adcock: Objection.

"Mr. Goldstein: We object to that.

"Mr. Adcock: May our objection go to the same line of questions——

"Judge Wilkerson: The record will be made, as to the entire line of questions.

"Mr. Adcock: All right.

"Judge Wilkerson: I am doing that in order to save time. Go on.

"A. I think not."

It is an attempt, it seems to me, to compare things that are not similar. The bonds of the Bell System have a certain classification as to security, and a certain credit standing. The other bonds in some cases are of different classes of corporations and of different rating. The security varies, while the security of the Bell System bonds is very high. The security of a miscellaneous assortment of bonds may be high, or may be medium.

"Mr. Adcock: I want to move to strike out that portion of the answer as to bonds having certain classifications.

"Judge Wilkerson: The record will show——

"Mr. Adcock (continuing): You cannot tell what the witness is referring to.

"Judge Wilkerson: The record will show your motion."

What I referred to was this: The exhibit shows railroad bonds, public utility bonds and industrial bonds. Those are different classifications, in the character of the issuing corporation. With a railroad or an industrial bond, the measure of credit of the railroad or the industrial may be quite different from the measure of credit of the telephone company. There is a variation in the character of the corporation and there is of course a very material variation in the security behind the bonds—bonds having the same rating. In my opinion the same holds true with regard to the comparison set up with regard to X-238, X-239, X-240, X-241, X-242, X-243, X-244, X-246, X-247, X-248 and X-249.

[fol. 7074] "Q. Now, in X-250 a comparison is made between what is called the average yield on common stocks,

and what is called the average yield on bonds. In your opinion, is that a proper comparison to make, to prove any facts of value in connection with the marketability of securities, or rate of return, to the American Company or the Illinois Bell?

"A. It is not.

"Q. Why not?

"Mr. Adcock: We are asking that the same objection apply to this same line of questions.

"Judge Wilkerson: Yes."

The primary consideration which is effective in determining the market value of a stock is not merely the yield on dividends paid. The earnings per share are a much more important factor in determining the market price than the dividends actually paid. For that reason, the yield of a common stock based on the dividends paid at any particular time has far less significance than the earnings per share of the stock at that particular time. I think the same is true with regard to X-251, X-252, X-257 and X-259.

X-259 is a tabulation showing the high and low price at which American Telephone and Telegraph Company common stock sold in the years from 1901 to 1931 inclusive. And then there is another column showing the rate of dividend paid on that stock during each year. Then there is another column showing the yield of the stock at each of the high and low prices, based on the dividends paid for that particular year, and then there is another column giving the average of these two yields for each of these years. In this tabulation (A-260) I have taken the high and low prices of American Telephone and Telegraph Company stock for the years 1921 to 1928, inclusive, from X-259. I have assumed they were correct. Next, I have had prepared the earnings of the American Telephone and Telegraph Company per share annually calculated for those years that I have used. Then I have shown the percentage of these earnings upon the market price of the stock, the [fol. 7075] high and low of each year. That is, I have proceeded precisely as Mr. Hammond proceeded in the city's exhibit, except that I have substituted for the dividend payments made by the company, the annual earnings per share of the company. The last column shows the average of these percentages calculated in a similar way to the average

yield in the exhibit. I carry this tabulation only through the year 1928 because in the year 1929 the stock of the American Telephone and Telegraph Company sold at such a price that it indicates that the purchaser was not interested primarily in the yield of the stock at that particular time. It was, as we know, a period of enthusiastic optimism, and the stock was purchased by people who it is quite evident anticipated a return in appreciation very much in excess of the yield of the stock at the prices ruling. The yield of the stock or the dividend paid, or the dividends likely to be paid in the near future during that year, was lower than could have been obtained on the senior obligations of the company, namely, on bonds, and it is quite evident that the purchaser of the stock during those years was not primarily concerned with the yield of the stock from the dividends paid or likely to be paid during the next few years.

(Plaintiff offered sheet marked Exhibit A-260 in evidence.)

The condition that I have described as existing in 1929 existed to a substantial extent in 1928 also at the time when the stock sold at the highest price, during 1928.

The dollars per share earned annually shown on this sheet do not include the $48,000,000 dividend paid by the Western Electric Company in 1927. They do not include the undistributed profits of the Western Electric Company. The inclusion of those figures would show a higher percentage return in the last column.

In my opinion the average percentage of return shown on this sheet does not indicate the full amount of return that would be required to finance the American Company. The price at which stock sells from time to time in the open market is no indication of what price a large block of stock [fol. 7076] would have to be sold at in order to have it subscribed by the stockholders to whom it might be offered. When one individual sells a block of shares of a company to another individual, there is no additional capital enlisted in the industry. On the other hand, when a company desires to attract additional funds, for its purposes, by offering a new block of stock, then there is enlisted further capital for that particular corporation. For instance, in 1930, the American Telephone and Telegraph Company offered, as I recall it, over $250,000,000 worth of stock at par. Nat-

urally, the stockholders who subscribed for that stock did not at the time the stock was first offered, have on deposit, $250,000,000. Many subscribers must have sold other securities in order to exercise their subscription rights. Other stockholders must have arranged to go into debt to take up their shares of the stock. The price at which an additional large block of stock may be issued by the company is invariably, I believe, below the price at which the stock may have been ruling just prior to the time of the offer.

"Q. Now, Mr. Hoyt, referring to Exhibit X-229, you find there an average worked out for the Bell System, for cost of its bond money, of 5.62 for the years 1921 to 1931, and 5.44 for the years 1923 to 1931,—does that fact furnish any indication as to what rate of return is necessary to attract capital to a venture such as that of the American Telephone and Telegraph Company?

"Mr. Goldstein: We object to that question.

"Judge Wilkerson: He may answer the question subject to the objection. There will be the same arrangement about the record."

The exhibit shows that the average cost of bond money for the Bell System was approximately 5.5 per cent. The average from 1921 to 1931 was 5.62; the average from 1923 to 1931 was 5.44. This indicates that if the bond money, having in mind the fact that the bond debt of the company is less than one-quarter of its total assets—if its bond money cost it about 5.5 per cent, it indicates to me that in order [fol. 7077] to obtain all of the money needed, the balance having been derived by the issuance of stock, the total return on all capital invested in the enterprise would have to be approximately 8 per cent, inasmuch as the risks and hazards undertaken by the stock purchasers were of course very much in excess of the risks taken by the bondholders, who had a first lien on the property in an amount representing a very small proportion, a very moderate proportion, of the total assets.

Cross-examination.

By Mr. Goldstein:

I had Exhibit A-260 prepared. The figures in the second column entitled "Dollars per Share Earned Annually"

were provided by the Comptroller of the American Telephone and Telegraph Company. I know what the dollars per share earned annually is intended to cover. It is intended to cover the earnings of the telephone companies on the consolidated basis, showing the earnings of the subsidiary applicable to the stock of the parent corporation. It includes in other words undistributed earnings of the subsidiaries in excess of the amount actually paid by such subsidiaries in dividends to the parent corporation, excluding of course the excess of the Western Electric Company. Deduction is made for minority interests. It is, I believe, a true picture of the earning power of the stock of the American Telephone and Telegraph Company except for the exclusion of the Western Electric Company surplus earnings.

"Mr. Goldstein: Now, am I to understand that the second column in 260 covers—comes from CR-53, is that correct?

"Mr. Blackman: Yes, I understand that is the source."

If I were getting a true picture of the earnings of the American Telephone and Telegraph Company, I would take the earnings and the undistributed earnings from all of the subsidiaries. I omitted the undistributed earnings of the [fol. 7078] Western Electric Company and its subsidiaries, simply because it seemed to be a custom of the company to treat that as an investment, and not as a telephone operating property. They include in their earnings, in that particular company, only the dividends received by the American Telephone and Telegraph Company. From an investment standpoint, if you were to figure the value of securities as having a bearing on the price, the investor would take into account also the fact that there were additional earnings that the American Telephone and Telegraph Company had that it did not disclose in its earnings statement.

"Q. So that you would consider all of the profits of the Western Electric Company, and all of the profits of all of the subsidiaries of the Western Electric Company, and their sub-subsidiaries.

"A. I would give consideration——

"Q. Is that correct?

"A. (Continuing): —to the fact that that was in effect, an understatement of the earning power."

A-260 is really not a full statement of all of the earnings. It is just a partial statement. The footnote that it does not include the dividend of $48,000,000 and the undistributed profits of the Western Electric Company; that is the undistributed profits of each year.

"Mr. Blackman: I understand there is no objection to Exhibit 260.

"Mr. Goldstein: None at all."

(The document was thereupon received in evidence, marked Plaintiff's Exhibit A-260.)

[fol. 7079] F. M. Williams, recalled as a witness on behalf of the plaintiff, having been previously duly sworn, further testified as follows:

Cross-examination.

By Mr. Goldstein:

June 30, 1932.

On direct examination I spoke of the trend shown on page 2 of Exhibit X-13, and Mr. Sloan's trend with respect to installation cost of equipment specifications, as not being comparable. They are not comparable in the following respect: I understood that Mr. Sloan took the equipment as it was shipped originally, and carried it on from year to year on the same basis. We prepared our trend information on the basis of the manner in which the installation work was being done, year by year.

R. H. Gregory, recalled as a witness on behalf of the plaintiff, having been previously duly sworn further testified as follows:

Cross-examination.

By Mr. Goldstein:

June 30, 1932.

"Q. Mr. Gregory, on direct examination you spoke of notes payable as not being properly deductible even if they were for short periods, and you said these notes payable were not given for merchandise. If the notes payable had been given for merchandise would they be deductible?"

I think the notes payable would be deductible if they were for a short period. If they were for merchandise over a long period of time I would question whether they would be deductible. The difference there would be the question of the length of time.

Now, suppose we gave a note to a bank for 30 days, to pay taxes, or to provide money to pay taxes, or to pay payrolls. I would not deduct that note because at the particu- [fol. 7080] lar period when we were making bank loans, or borrowing from banks, it was more or less of a continuous process; we were paying them off in some months, and then we were borrowing in other months; and I think it is perfectly fair to take the average condition outstanding, on that particular item.

The reason why I would not make any deduction for the notes payable was that the money represented by them was included in the business, and at the risk of the business. I think the loan for temporary working capital and the note which is given for merchandise, and the merchandise used in the business are both at the risk of the business. The determining factor is more the time element, and also the risk; they are both at the risk of the business. By "time element" I mean if the time element is a month or so, I would say that would be considered more as a current payable, and deductible; but if it is more than a month, if it was a continuing process of borrowing money from the banks, the average condition of such a situation could be considered properly as money invested in the business and at the risk of the business.

Exhibit A-253 is entitled "Information submitted to counsel for the City of Chicago March 14, 1932, to June 15th, 1932". That is in the same form as, and a continuation of, A-73. The same sort of condition applying to A-253 with reference to the various items would apply also to all of the items I furnished; that is some of them were made up specially, some of them were already prepared, and some of them had been prepared for other cases.

Gregory's Exhibits 1 and 5, referred to in the correspondence and motion in this case are the same as Exhibits A-77 and A-79 in this case.

I was asked regarding Defendants' Exhibits X-294 and X-295, and I gave the financial history of the Western Electric Company up to 1920. In 1915 there was outstanding $15,000,000 aggregate par value common stock of the Illi-

nois Corporation. Of the $15,000,000, $6,250,000 had been paid in in cash from 1881 up to 1915. The total capital [fol. 7081] and surplus at the end of 1915 was approximately $40,000,000. The New York Corporation paid for the assets of the Illinois Corporation. It paid to the stockholders 150,000 shares of 6 per cent preferred stock of the New York Corporation and redeemable at 120.

The fact is that a man who was a stockholder in the Illinois Corporation and owned one share of stock in the Illinois Corporation received therefor one share of preferred stock of the New York Corporation and one share of the common stock of the New York Corporation. He received it for the surrender of that stock. The New York Corporation turned over to the stockholders, for each share of common stock in the Illinois Corporation, one share of preferred stock and one share of common. That preferred stock was redeemable at $120. In 1917 the New York Corporation issued again $15,000,000 worth of preferred stock and it was subscribed for at par. That was likewise redeemable at $120 per share.

In 1920, thirty million dollars of preferred stock was retired at $120 per share and two hundred thousand shares of common stock were issued at $180 per share.

I said that the exchange was made on March 9th under two separate resolutions. One resolution called for the redemption of the preferred stock at 120 and the other for the issuance of the common stock to the common stockholders in the ratio of 4 shares to 3. I spoke yesterday of the effect of that transaction as merely being a transfer, and not a cash redemption, and not a transaction of the purchase of the stock. I was speaking from the point of view of the Western Electric Company and I was speaking also from the point of view of the American Telephone and Telegraph Company. The American Telephone and Telegraph Company had something like 297,000 shares of preferred stock, and they received in payment therefor the common stock without the payment of or transfer of one dollar in cash.

I do not know the accounting procedure followed by the American Telephone and Telegraph Company in connection [fol. 7082] with this transaction. I have never seen the books, or any records of the American Telephone and Telegraph Company bearing upon this transaction. So I have no knowledge how the American Telephone and Telegraph Company treated the transaction.

I prepared Exhibit A-254. The information for this exhibit was obtained from various sources. The principal information was obtained from the records and files of the National Association of Cost Accountants. It was also obtained by telephone and from consultation with various representatives of different companies whose names are listed on this statement.

"Mr. Goldstein: We want to note an objection to this exhibit on the ground that the sources from which it is taken, are hearsay, and there is no way we can check them.

"The Witness: It is quite generally known, Mr. Goldstein, that a standard cost system is used."

I got this information from the files of the National Association of Cost Accountants, and I also got it from direct contact with the comptrollers or accounting officers of the various companies, by telephone. The National Association of Cost Accountants is an association of cost accountants, which has in its membership representatives of most of the manufacturing companies in the United States. It holds annual meetings and discusses various problems in connection with cost systems in the manufacturing business. I think they publish a list of the members. These names were taken from the files in their possession. I did not do that myself but my representatives did go to their files. Now, in just what form they found that information, I am not in a position to say at this time.

The Association is located at New York. I do not know whether they have files in Chicago similar, or not. These files that we looked at, were in New York.

"Judge Wilkerson: Well, now, let me say, if you press your objection, and you make *application to the Court to* issue a subpoena for the officers of this association to bring [fol. 7083] in their books and papers—if you press it, I will do that.

"Mr. Thompson: I understand, Mr. Goldstein, that your witness, Mr. Hagberg is a member of this Association."

(The Court stated that if the city had any difficulty about verifying the correctness of this exhibit it might renew its motion to strike.)

I spoke of the profit on the International Western Electric Company's sale being related to profits to 1882. I am familiar with the agreement for the sale of the International Western Electric Company to the International Telephone

and Telegraph Corporation which is identified as Defendants' Exhibit X-68. I am familiar with the agreement of October 1, 1925 between the Western Electric Company and the International Western Electric Company. (Defendant's Exhibit X-68-A.) I am familiar with the franchise that was given to the International Western Electric Company under these agreements, to make use of the inventions of the American Telephone and Telegraph Company and the Western Electric Company. I took all of the facts into consideration in my answer in so far as they are relevant to the point at issue.

I spoke of a claim which we made to the Internal Revenue Department in connection with the Field Examiner's inspection in 1930. I have a copy of that claim here. I do not know anything about any refusal of this document to Mr. McCann by my department; I do not think he ever asked for it. I know of a request for correspondence with the Internal Revenue Department. This is not correspondence. It was the claim made to the Field Examiner while he was right in the office. I did not consider that as coming within that request. If he had asked me for the claim, I would have been very glad to give it to him.

(The above mentioned document was identified as Exhibit A-261 and was received in evidence. The Court held that since counsel for the city had called for the production of [fol. 7084] said document it was in evidence. Defendants moved that the oral testimony of the witness be stricken because it was based on a written document.)

I spoke of the surplus adjustments of the 88 companies and stated that there was a certain effect produced by that. I have here no working papers upon which my conclusion was based. All of the working papers in that connection are simply the comptometer records, if available, of the adding up of the figures on defendants' exhibit. What we did was to add the plusses and minuses together, to get the net result, and figure out the percentage to the investment which was shown on the exhibit (I think it was A-85). That is, I took the adjustments, and added them, or subtracted them, as the case may be, whether they were red or black, for the five-year period, lumped those together and then related them to the consolidated investment for the five-year period.

I spoke of the Western Electric Company having paid actual cash for the good will of the Teletype Corporation. It

paid the cash to the owner of the stock of the Teletype Corporation at the time of the purchase. The owner at the time was the American Telephone and Telegraph Company. The American Telephone and Telegraph Company as I previously testified in detail paid for that stock by the issue of 150,000 shares of American Telephone and Telegraph Company stock, for 150,000 of the Teletype Corporation stock.

In connection with the 88 companies (Exhibit A-85), I think that in every case where good will appeared I deducted it in computing the net investment.

I do not know whether the good will in any one of those cases was paid for by the stockholders to other stockholders.

I examined X-51, X-52, X-55 and X-88. If the heading "Net profits per Exhibits A-77 and A-79" is correct on these exhibits, as I assume it is, there is no adjustment then to any of the profits shown in my exhibits.

[fol. 7085] I did not personally examine all of Mr. McCann's exhibits bearing upon the Bell and non-Bell profits, but it was done under my jurisdiction. I have seen Exhibits X-55 and X-88, where the headings appear, "The Investment Adjusted" in one column and "The Profits Adjusted" in another column. As far as the mathematics of these two exhibits is concerned, that is the additions and subtractions, I have no criticism; that is, of the particular profit columns, and so on. I am not talking now about the relations or percentages at all, nor the methods, at all.

I spoke of the 1925 cash deduction by Mr. McCann. I stated that the Western Electric earned 5 per cent. This 5 per cent was on the cash items that were included in the amount. I don't carry in mind how much it earned on the cash alone, but it would probably be the prevailing amount allowed by banks at that time for money on deposit.

CR-714 of the Western Electric, which is X-200, does not show all of the cash and cash items. As far as cash is concerned it shows the rate of interest received on all the cash of the Western during 1925.

Mr. McCann deducted not only cash, but the cash items as well. This twenty million dollars he deducted was cash and cash items. My criticism of his deduction and his inclusion of 2.5 per cent interest is based upon my understanding that what he deducted was cash and cash items in the amount of twenty million and not cash alone.

I criticised one of Mr. McCann's exhibits where he had combined Chrysler and another corporation to show the

turn-over. I stated it had no application to A-77 and A-79 and A-80. What I was talking about is the turn-over for the various classes which we discussed at some length in March. They were the three classes, telephone apparatus, lead-covered cable, and special commercial products or appliances, as you have described them. When I said on direct examination, yesterday, that the turn-over was the same for Bell and non-Bell business, I did not have in mind all the telephone apparatus (including commercial products) sold to Bell customers, on the one hand, and all the telephone [fol. 7086] apparatus (including commercial products) sold to non-Bell customers, on the other hand. I had in mind telephone apparatus by itself, and special commercial products, or appliances, in another class by itself. I treated them by separate classifications.

I spoke of Mr. McCann overstating the profits of the Bell business for the earlier years by a million and a half, because of something that he had done with reference to pension accruals. That million and a half was over a period of years prior to 1925. The composition of that million and a half by years is as follows: In 1916, $62,000; in 1917, $103,000; in 1918, $82,000; in 1919, $109,000; in 1920, $255,000; in 1921, $213,000; in 1922, $265,000; in 1923, $363,000; in 1924, $30,000.

The aggregate is 1,482,000. I used the round figure of a million and a half dollars.

In connection with A-256, "Average Notes Payable": the Western Electric, in its income account in its annual reports, treats interest on loans made to subsidiary companies as income. I treat only the interest and whatever dividends are received as income. All there is, of course, on loans in the way of income is the interest. The only income that we show from loans is the interest paid by the subsidiary to the Western Electric Company; that is the only possible income that can be obtained.

I spoke about delivering to the defendants in December a consolidated statement with a notation that it was temporary, and that it was subject to check. The document which I delivered in December was similar to A-84, and contained only three lines, in addition to the heading. One entitled, "Net profits", and the other, "Average investment", and the other, "Per cent return on investment". Exhibit A-84, and the sheet which I gave defendants in December covered the consolidated earnings of the Western Electric

and all of its subsidiaries. It covered all of Western's subsidiaries for the period from 1916 to 1931, inclusive, with the year 1931 on an eight months' basis, raised to a twelve months' basis. Those subsidiaries included not only the American subsidiaries, but the foreign subsidiaries and the Canadian subsidiaries, to the extent that we owned an in-
[fol. 7087] terest. The underlying papers on this consolidated statement were in the hands of our auditors until about February 11, when it was turned over to representatives of the defendants.

When, in connection with D-61 I spoke of 85% of the information having been made available to defendants, I meant that the information for the period from 1916 to 1931 was made available, and the profits of that period represented 85 per cent of the profits of the entire period.

"Q. You spoke of some document having been copied by our representative?

"A. Yes.

"Q. Where were you on May 6, 7, 8 and 9, Mr. Gregory? As a matter of fact, you were in New York?

"A. Yes; I got out here on the 13th.

"Q. Yes.

"Mr. Thompson: Is it denied that that was copied?

"Mr. Goldstein: Well, I certainly do not intend to have the record show as it now stands, and I would like to have the witness on because the delivery of those documents have something very important attached to them. When the documents were delivered, and the representative came to my office in connection with that, we wrote the letter that the information was not what we wanted. Now, the record as it now stands would seem to appear that we got everything we wanted, so Mr. Gregory's statement is on hearsay, and I would like to have somebody who will give the whole transaction.

"Mr. Thompson: Do we have to waste the time of the Court, if you admit that your representative did make a copy of the information?

"Mr. Goldstein: I will admit that the representative made a copy of the letter which is referred to in our Exhibit X-344, and is the document referred to in the letter of May 31, 1932, addressed by me to Mr. Bracelen; if you will stipulate to that I am perfectly agreeable to have the record stand as it is.

"Mr. Thompson: Let's see it.

[fol. 7088] "Mr. Goldstein: That refers to the same matter.

"Mr. Thompson: Yes. Well, we will see about that later. There is no use stopping now about it.

"Mr. Goldstein: All right; I just wanted to know.

"Mr. Thompson: I know you got the copies, and if necessary, I will call the witness.

"Mr. Goldstein: All right. But I want to show that the document that I was referring to—that Mr. Gregory has referred to, is a document that was delivered here in Chicago, that Mr. Gregory knows nothing about excepting by hearsay.

"Judge Wilkerson: If he knows nothing about it, why ask him about it?

"Mr. Goldstein: But he made the statement it was delivered. I will have the answer stricken, as being based on hearsay.

"Judge Wilkerson: Do you know anything about it?

"A. Yes, I do know something about it."

I was here May 13th. As I recall, to the best of my recollection, we first sent to defendants a statement analyzing the data by years, which they said was not what they wanted. Then they asked for the underlying data back of that. And I was in Mr. Thompson's office at the time when we decided to send that document over to them and give them a chance to copy it. I know that it went over to them. Now, as to whether it was copied or not, I wasn't there, I was not present when they copied it. I know it was sent to them for the purpose of copying it.

"Q. Yes, but you testified it was copied. We ask the answer be stricken unless we can get a stipulation as to what the facts are.

"The Witness: I know you wanted to copy it, and I presumed you did copy it.

"Mr. Goldstein: There are a lot of things I wanted and didn't get. I ask it be stricken, unless we can stipulate that document is the document referred to as of May 31, 1932, because the record as it now stands, qualifies that letter.

"Judge Wilkerson: The matter is too complicated for me [fol. 7089] to rule on without examining the record. The record will show your motion. You may call it up in argument, hereafter.

"Mr. Thompson: The statement, I believe, is not an accurate statement, but I will check it."

Exhibit A-257 shows on its face that it covers the periods 1916 to 1932, inclusive, and 1923 to 1932, inclusive. The last column is for the entire period, for each of the periods. That is on the first line, for 1916 to 1932, and the second line, 1923 to 1932.

"Q. In connection with your statement as to the option, Mr. Gregory, did you know about a license contract given on May 24, 1927, or an extension of a license contract in which the American Telephone and Telegraph Company participated, to the Automatic, on the day when the money was paid over to the Electrical Research Products?

"A. I am not entirely familiar with that, but I know there is such a license contract in evidence.

"Q. You did not take that into account in any of your calculations in connection with the exhibit X-257, did you?

"A. The basis for the calculation has been testified to, and is also stated in the explanation of the adjustment.

"Q. And is limited solely to the considerations given there, and not to all of the considerations in connection with the option contract?

"A. I think it is clearly stated in the record.

"Q. All right. You spoke of working reserves. Mr. Gregory, when you set up your working reserves, you set up the full amount, do you not, as an operating expense, without taking into account that between the time when you set it up and the time when you use the money, the money might earn an income?

"A. Why, we set it up currently, from month to month."

We set up whatever we think is a proper amount of accrual, and charge that amount against the cost of sales. If we need, say, $100,000 a year from now, we set up one-twelfth, of the full amount that we were estimating at that particular time. The next month it might be a different [fol. 7090] amount. If we estimated that we would need $1,200,000 twelve months from now, we would take one-twelfth of $1,200,000, or $100,000 currently.

Redirect examination.

By Mr. Thompson:

When the Western Electric Company of New York was organized it took over all of the assets of the Western Elec-

tric of Illinois and issued stock in payment for those assets.

Mr. Goldstein has spoken about the purchase by the Western Electric Company from the American Telegraph and Telephone Company of the stock of Teletype Corporation, which had been acquired by the American Telephone and Telegraph Company from the owners of that stock. The American Company issued 150,000 shares of its stock. The market value of that stock at the time of the issue was $215 a share.

We did not carry cash as large as $20,000,000 currently in our business. When I talk about twenty millions of cash being deducted in 1925, that means cash and cash items.

Exhibit A-257, which has been introduced in evidence, about which I was asked on my cross-examination, merely contains a brief statement of the facts in connection with each one of the controverted points set out on this exhibit, and in preparing this I took into consideration not only the facts set out on this exhibit, but all the facts I have previously testified to.

"Mr. Thompson: That it all. We offer in evidence Exhibit A-261, which is the document which was produced by Mr. Gregory while on the witness stand, at the request of Mr. Goldstein.

"Mr. Goldstein: With reference to some of these exhibits, there are the same objections to them that we had to the earlier Gregory exhibits, of which these are merely extensions or modifications, and we would like to follow the same procedure here as we followed with reference to the other exhibits; we will preserve formal objections, and place them with the exhibits, and the other side can state theirs."

(Which said document, so offered and received in evidence, was marked Plaintiff's Exhibit A-261.)

[fol. 7091] WILLIAM H. EGAN, called as a witness on behalf of the plaintiff, having been first duly sworn, testified as follows:

Direct examination.

By Mr. Thompson:

June 30, 1932.

My name is William H. Egan. I reside in New York City. I am senior accountant in the firm of Arthur Young and Company, who are accountants and auditors with offices in New York City, Chicago and other cities. I have been engaged in the accounting business 18 years. Prior to the war I was with other accounting houses and in commercial practice. Subsequent to the war, from 1919 to 1926 with Patterson and Ridgeway, Certified Public Accountants of New York City, and since that time as a senior accountant with Arthur Young and Company.

The firm of Arthur Young and Company has audited the books and records and certified to the published accounts of the Western Electric Company for the five-year period ending December 31, 1931. That firm has also audited the books and records of the following subsidiaries of the Western Electric Company for the period of time indicated: Electrical Research Products Inc., for the period 1927 to 1931, inclusive; Graybar Electric Company, Inc., for the year 1927 to 1928; Bell Telephone Laboratories, Inc., for the four years ending December 31, 1930; Manufacturers Junction Railway, for the five-year period ending December 31, 1931; 395 Hudson Street Corporation, for the five years ended December 31, 1931; Weco Realty Corporation for the years 1930 and 1931; Weco Corporation for the years 1930 and 1931, and Teletype Corporation for 1931.

These audits were made in the regular course of business. All the work of auditing the books and records of the Western Electric Company, and of its subsidiaries to which I have specifically referred, was done under my personal direction and supervision.

[fol. 7092] In my opinion, from the audits which I have made in the regular course of business, the books and records of the Western Electric Company during the five years ended December 31, 1931, and the books of the subsidiaries which I have named during the period for which I audited them, were correctly and accurately kept and the entries made therein in accordance with sound accounting practice.

The firm of Arthur Young and Company was employed for the purpose of examining certain exhibits which had been prepared by Mr. R. H. Gregory, Comptroller of the Western Electric Company, which have been introduced in evidence in this case and for the purpose of checking the figures contained in these exhibits against the records of the Western Electric Company and its subsidiaries and in the case of certain exhibits, against figures contained in Poor's and Moody's Manual, for the purpose of determining whether these exhibits correctly and accurately set forth the figures which they purport to show. I have a list of the exhibits which I examined there.

(Which said list was identified as Plaintiff's Exhibit A-262.)

Exhibits A-75, A-77, A-78, A-79, A-80, A-81, A-84, A-85, A-86, A-87, A-88, A-89, A-90, A-91 and A-83, are the exhibits which I checked and audited as against the records of the Western Electric Company. The firm of Arthur Young and Company was employed to do this work about December, 1930.

"Mr. Adcock: If the Court please, I don't see how this is rebuttal testimony. It does not rebut any questions we have raised.

"Mr. Thompson: Yes, it does.

"Mr. Adcock: How?

"Judge Wilkerson: What is the objection? To the whole line of questioning?

"Mr. Adcock: Yes.

"Judge Wilkerson: Well, I suppose because Mr. Gregory is an employee of the company.

"Mr. Thompson: Beg pardon?

[fol. 7093] "Judge Wilkerson: I say, I don't know on what theory it is offered. I suppose it is offered on the theory that is followed in a large number of instances, that he is employed by an interested party, and this is offered as being made by somebody who is disinterested.

"Mr. Thompson: Of course, and then when they are challenging, we are here to prove the accounts are correct.

"Mr. Goldstein: We have not challenged any accounts.

"Judge Wilkerson: For instance, when we have a receivership here, when a property goes into the hands of a receiver, they have an accounting department, they have a comptroller, but the first thing is to have the books

audited—usually, I would say, the first thing is to have the books audited by some disinterested firm of accountants at the time that the Court takes the property over. Nobody may be assailing the accuracy of it, but it is the act of an interested party.

"Mr. Thompson: His testimony will go somewhat further than that in rebuttal too.

"Judge Wilkerson: But on that theory, it is perfectly proper."

In addition to the time spent on our regular auditing work, from December, 1930, until about the middle of May, 1931, we worked continuously on this job with an average of 10 to 12 men. We again took up the work about the middle of November, 1931, and have worked practically continuously until the present time, with an average of about four men. In checking Mr. Gregory's exhibits, I had access to and used the same books and records which he used in the preparation of his exhibits.

"Q. I hand you now Exhibits A-75, 77, 78, 79, 80, 81, 83, 84, 85, 86, 87, 88, 89, 90 and 91, and ask you to state whether you did in fact supervise the checking of these exhibits against the records of the Western Electric Company and its subsidiaries, and in cases wherever referred to, to Poor's and Moody's Manuals, against these manuals?

"A. I did."

We have audited for the five years ended December 31, 1931, the books and records of the Western Electric Com-[fol. 7094] pany at its head office in New York, at its Hawthorne and Kearny plants, and at its New York and Chicago distributing houses. We have also audited its previously mentioned subsidiaries for the various periods referred to. For the other distributing houses and subsidiaries of the Western Electric Company, we examined records made to the Comptroller of the Western Electric Company, in the regular course of business, which are the same reports testified to by Mr. Gregory. For the years 1916 to 1926, not previously audited by us, we have examined the books and records that were available at its head office in New York, at its Hawthorne and Kearny plants, and at its New York and Chicago distributing houses. For the other distributing houses and subsidiary companies, we have examined reports made to the Comptroller of the Western Electric

Company in the regular course of business, which are the same reports testified to by Mr. Gregory.

These exhibits which I have listed, correctly and accurately reflect the entries on the books of the Western Electric Company and its subsidiaries, where they related to Poor's and Moody's Manuals, or the figures in those manuals which the exhibits purport to show.

I have checked the allocations and apportionments made by Mr. Gregory and used by him in his Exhibits A-77 to A-80, both inclusive, of net profits and average investment as between Bell and non-Bell business. I think they were correct and proper methods and that the use of them will give a substantially accurate result. Sales as shown on these exhibits are actual sales and were verified by us from the records and the books of the company. The company allocates expenses not included in the shop cost of sales, directly to Bell and non-Bell business where possible, but expenses which cannot be directly allocated, are pro-rated on the basis of shop cost of sales. This distribution was reviewed by us. In my opinion, the methods used for making these various allocations and apportionments are correct and in accordance with sound accounting practices.

I have seen Exhibit X-35 which was prepared by Mr. Hagberg and which has been introduced in evidence in this [fol. 7095] case. This exhibit shows for a number of groupings of years, between 1916 and 1931, and for the entire period, that the net shop variations and other adjustments which were made to basic gross profits by the Western Electric Company in order to make apportionments between its Bell and non-Bell business were the result of certain gross adjustments, plus and minus, which were much larger when added together, than the net adjustments. I am familiar with this fact. In connection with the properties of the company's method in this connection I believe that the apportionments are substantially correct and that it would have made no appreciable difference if the gross variations, plus and minus, had been apportioned. This is true, in my opinion, because in the main, these apportionments relate to telephone apparatus and lead-covered cable which are manufactured by the company, both for its Bell and non-Bell customers in the factories and on the same machines and are of the same general type and character.

In my check of Mr. Gregory's exhibits I found two items in which I would make a change and I found other items

which I would treat in years, differently from what they are treated in his exhibits.

First, in 1924, an appropriation was made for pension fund purposes, of $2,000,000 and charged entirely to the Bell business. $120,000 of this should have been assessed to the non-Bell business and I would now make this change if I were recording the facts. This would result in increasing the Bell profits for 1924 by $120,000.

Secondly, patents had been charged, up to four or five years ago, to reserve for contingencies instead of being included in the cost of sales. Such patents, in my opinion, are a proper charge against cost of sales, and this would result in decreasing the Bell profits on the Western Electric if so treated.

Third, in 1928, the Western Electric Company made a reserve for machinery depreciation of $2,000,000 representing the difference between annual depreciation rates of 7½ and 10 per cent. This was entered on the books for 1928. As [fol. 7096] a matter of fact, this reserve was applicable to the years 1924, 1925, 1926 and 1927, and I would so record it now, if I were making new apportionment between Bell and non-Bell business. I would make no difference in the amount to be recorded, but would merely distribute it among different years.

Fourth, for the period 1924 to 1927, the Western Electric Company made an extraordinary reserve for depreciation of $8,233,000. This was to cover a loss in value for the years 1917 to 1927 in its physical plant. I think that this item would not affect the profits, but I would decrease the average investment by reducing the cost value of the plant.

Fifth, with respect to federal taxes, the company bases its yearly results on accruals. There is no other way in which it can do this. If I were re-stating Mr. Gregory's exhibits, I would use the actual payments instead of accruals which would make a difference of about $200,000.

In case changes were made other than the extraordinary reserve for depreciation for the period 1916 to 1931, it would reduce the return on investment on the Bell business one-tenth of 1 per cent. For the period 1923 to 1931, it would increase the return one-tenth of 1 per cent. In regard to the change in regard to handling extraordinary reserve for depreciation, I figured that that would increase the Bell profits in the neighborhood of two-tenths to three-tenths of 1 per cent.

* * * * * * *

[fol. 7097] WILLIAM H. EGAN, recalled as a witness on behalf of the plaintiff, having been previously duly sworn, further testified as follows:

Cross-examination.

By Mr. Goldstein:

July 1, 1932.

The only audit reports which have been issued by my firm in connection with the audits of the Western Electric Company, or the Electrical Research Products Company, are the certificates on the back of the annual reports of the Western Electric Company where Arthur Young's name appears.

When I stated:

"The apportionments are substantially correct between the Bell and non-Bell. It would make no possible appreciable difference if the gross variation plus or minus had been apportioned, because in the main these apportionments relate to telephone apparatus and lead covered cable which were manufactured by the company both for its Bell and non-Bell customers, in the same factory, on the same machine, and are of the same general type and character."

I meant that the same general type that is sold to both the Bell and non-Bell customers is made on the same machine. That is, the same identical item, if sold to both Bell and non-Bell, is made on the same machine. I am not expert enough on the manufacturing to know whether a switchboard lamp and a panel frame are made on the same machine, but I know the general structure of the company is such that the same goods that are sold to the Bell and non-Bell are made on the same type of machine. That is the identical item, for instance a switchboard lamp, is sold to Bell and non-Bell customers. It is only in that aspect that I am referring to it when I say that they are of the same character. I had that in mind at the time of my answer.

[fol. 7098] JAMES CAMPBELL BURTON, called as a witness on behalf of the plaintiff in rebuttal, having been first duly sworn, testified as follows:

Direct examination.

By Mr. Thompson:

July 1, 1932.

My name is James Campbell Burton. I live in New York City. I am a partner of the firm of Arthur Young and Company, Accountants and Auditors. I have been connected with that firm since the year 1921. For a period of eight years prior to that I was out of the accounting business, but prior to that eight years I had eight years before in the accounting business. During the eight years that I was out of the accounting business, I was in a department store.

I am acquainted with the Western Electric Company. The firm of Arthur Young and Company has done work for the Western Electric Company in auditing its records and the records of its subsidiaries, and in checking certain exhibits which have been introduced in evidence in this case. That work has been done under my personal direction and supervision. I know of the work which has been done and I have approved the results obtained. I supervised the work that has been done, have instructed the various accountants on the work, and have approved the findings made by them.

I have heard the testimony of Mr. Egan in this court room yesterday and today, in connection with the work of Arthur Young and Company in the auditing of the Western Electric Company's books and those of its subsidiaries and in auditing and checking certain exhibits of Mr. Gregory. I agree with Mr. Egan's testimony. I have knowledge of the facts as to which he testified.

(No cross-examination.)

. . . . . .

[fol. 7099] Allan B. Crunden, recalled as a witness on behalf of the plaintiff in rebuttal, having been previously duly sworn, further testified as follows:

Direct examination.

By Mr. Blackman:

July 1, 1932.

Referring to Defendants' Exhibit X-111, I am familiar with the manner in which the figure of 59.53 per cent, being

the last figure on that page, is obtained. The percentage figure of 63.39 on page 4 of Exhibit X-108 directly deter- [fol. 7100] mines the 59.53. It is used essentially in the capacity of a divisor. Being used as a divisor, the percentage on the last line of Exhibit X-111 goes up. It goes up as the 63.39 would go down. That is inevitable from the arithmetic of the proceeding. It has nothing to do with these particular examples, but it would be so in any comparable computation.

This 63.39 is obtained by dividing the last figure in the first column of figures on page 4 of Exhibit X-108, being $135,740,062.82 by the first figure in that column, $719,964,600. The first figure on the exhibit is the $719,000,000 plus and the other is the last figure on the exhibit in the first column. The first figure is called capital stock and the last figure is the sum of all of these figures representing capital stock, capital stock premiums, capital stock installments, funded debts, and loans from associate companies.

As a matter of elementary arithmetic, if the capital stock remains the same and any of the other figures that follow it are increased, the percentage attributed to the capital stock decreases. So if the capital stock premiums were increased, the percentage figure that we are dealing with would decrease. If the surplus were increased, that percentage would decrease. The decrease in that figure would increase the result which is obtained on Exhibit X-111 for the per cent return on investment, expressed in per cent of return to American Telephone and Telegraph Company stockholders on their average capital stock investment. The method followed on these pages dealt with, as a matter of mathematics, inevitably results in showing a greater return to the stockholder from the same amount of dividends the more he pays for his stock, provided he pays direct to the company for it. If you deal with all the stock, or with a part of it, along the lines of this exhibit, it would be the same. That is, the mathematics are the same. It is a fundamental principle that brings that about.

Exhibit X-112 takes certain figures representative of the actual results to the American Company of furnishing telephone instruments to the Illinois Bell Company, Chicago [fol. 7101] division, and it includes a showing of per cent return on investment ranging from 6.83 to 6.93 in different years during the period 1923 to 1927; and it builds up these percentages to 25.65 to 30.71 per cent. That is done by two

processes; first, an additional return on investment is introduced in an amount equal to the difference between, first, the estimated cost, per books, to the American Company of providing instruments for the Chicago area, and second, an estimate of what that cost would be if the company were allowed depreciation and 8 per cent return upon current reproduction cost of instruments, less actual depreciation. The second process is that the return on investment is finally converted into a return to stockholders of the American Telephone and Telegraph Company on their proportionate investment in the capital stock. This conversion process is on the same basis as was referred to in the record in connection with Exhibit X-111.

The comparison which I have referred to is, in my opinion, a comparison of things that are not comparable.

Exhibit X-115 relates to telephone instruments used in Chicago, and purports to make a comparison between, first, certain data that the Company presented at the 1929 hearing, referred to in column 1 of this exhibit; and second, certain data that is presented at the present hearing; and third, the actual experience of the Company as presented at the present hearing. The data presented at the former hearing were provided by a witness who testified as to what it might cost the Illinois Company to furnish telephone instruments, if it had no arrangement for instrument service with the American Company. In other words, the data had to do with an arrangement which was not in effect in 1923 and could have been in effect in that year only by hypothesis.

The data referred to in the second column of Exhibit X-115 refer to data presented at the present hearing, purporting to show what would be a fair allowance for instrument service in Chicago for the year 1923 if it were proper to base the allowance as to depreciation and 8 per cent [fol. 7102] return upon the 1923 reproduction cost of the instruments, less the then existing depreciation. The third column of the exhibit has to do with the estimated cost of the Chicago area instrument services for the year 1923. The side heading on line 7, "Actual Return on Investment Obtained", is therefore unsuitable. It has no application to the first two columns and as regards the third column, it has reference to return on book investment.

Consequently, the exhibit should not be read as it might easily be read from mere inspection of the column headings, that the Company presented one showing during the 1929

hearing and another during the 1932 hearing, both of which were at variance with the actual experience as evidenced from the bookkeeping for the third column of the exhibit.

"Mr. Thompson: Your Honor, plaintiff withdraws its objection heretofore made to Exhibits X-220 and X-221, which are trust agreements between the American Telephone and Telegraph Company and the Bankers' Trust Company, trustee—that is Exhibit X-220; and X-221 is a blank form of agreement between the Bankers' Trust Company, trustee, and the various Bell associate companies.

"In that connection, the plaintiff also offers in evidence Exhibit A-269, which is an agreement between the Illinois Bell Telephone Company and the Bankers' Trust Company, trustee, dated December 31, 1927, and it is agreed by the parties that the agreement set out in Exhibit A-269 has been continuously in force since the date of its execution.

"Judge Wilkerson: Very well."

(The document was thereupon received in evidence, marked Plaintiff's Exhibit A-269.)

I have completed my statement with regard to Exhibit X-115, except to call attention to the fact that this exhibit converts the so-called percentage of actual return on investment obtained into a per cent of actual return on the net investment converted to average return to American Telephone and Telegraph Company stockholders. The return [fol. 7103] here referred to was not the actual return and the stockholders did not get any such return, and the method of conversion is, in any event, made on the same basis as was referred to by Mr. Rainwater in connection with Exhibit X-111, the method of which was described by me today. The comparisons that were set up there, in my opinion, were not comparisons of comparable things.

Exhibit X-121 shows data regarding the sale of telephone instruments by the American Company at December 31, 1927, to the licensee companies. It shows in parallel that there was no profit on the sale of instruments to the Long Lines Department but there was a profit on the sale of the instruments to the licensee companies. The Long Lines Department is a part of the American Telephone and Telegraph Company, and that company could not make a profit on a sale to itself. The caption "Sale Price", as applied to the Long Lines, is, therefore, unsuitable, and it is not consistent to so refer to the transaction in question.

Exhibit X-127 purports to show average return to American Telephone and Telegraph Company from dividends on its investments in capital stocks of licensee companies converted into average returns on their investment in the American Telephone and Telegraph Company. This is arrived at in the following manner: the procedure may be illustrated by reference to Illinois Bell Company and the year 1930, where the percentage of 11.24 per cent is shown. It first appears that by dividing average book value per share of Illinois Bell stock in the hands of the American Telephone and Telegraph Company into the 8 per cent dividend, the yield to the American Telephone and Telegraph Company is 7.67. From this is subtracted the average cost of funds to the American Telephone and Telegraph Company in that year of 6.25, leaving a balance of 1.42.

On Exhibit X-108 it appears that the American Telephone and Telegraph Company has outstanding capital stock, premiums, surplus, capital stock installments and payables of various kinds aggregating $2,746,000,000 plus, and that the capital stock alone is $1,585,000,000 plus, or 57.53 per cent. [fol. 7104] Dividing the 1.42 previously mentioned by 57.53 gives a product of 2.46. To this is added the average rate of dividend paid by the American Telephone and Telegraph Company on its capital stock in this year, 8.78, making a total of 11.24, which is expressed as a percentage of 11.24 per cent, purporting to represent the total return to stockholders of the American Telephone and Telegraph Company per $100 of American Telephone and Telegraph Company capital stock invested in Illinois Bell Telephone Company.

Exhibit X-108, from which the American Telephone and Telegraph Company capital stock figures for 1930 above mentioned were taken, also shows that the American Telephone and Telegraph Company had outstanding $200,000,000 plus of capital stock premiums and $366,000,000 plus of surplus.

The manner in which that return of 7.67 is jumped up to 11.24 is due primarily to taking account of these capital stock premiums and surplus on the wrong side of the equation. Had these items been greater in amount, and the remainder of the items, that is, the capital stock and outstanding indebtedness remained constant, the computed return of 11.24 per cent would be still higher. That is one of the factors I have already referred to in connection with

Exhibit X-111. Subtracting the 6.25 from 7.67 purports to leave a profit, but, of course, it is not the ordinary use of the term "profit". That is in no sense a net profit, in the usual sense in which the term is used.

Exhibit X-128 sets down for each associate company a yield to the American Telephone and Telegraph Company on the book value of its capital stock holdings in each of the associate companies of the Bell System. The yield is calculated in terms of the percentage of the amount received during the year in dividends to the American Telephone and Telegraph Company's book value of capital stock. There is subtracted from such yield the percentage cost of funds to the American Telephone and Telegraph Company in the same year, bringing down a balance which is entitled "Per cent of profit to American Telephone and Telegraph Company."

[fol. 7105] The same criticism which I have applied to the word "profit" in the previous exhibit applies to this one.

The exhibit (X-128) bears the general heading "Profit on Investment of Capital Stock of Licensee Companies", and the investment referred to is the book value of holdings of the American Telephone and Telegraph Company. No consideration is given in this exhibit as to whether the existing investment of the American Company in the stock of these companies is worth more or less than the book value at which it is stated on the American Company's books. Neither is any consideration given to any profits of the associate operating companies which were not divided in the years for which computations are shown. There is also no consideration given as to the manner in which the undivided profits of the associate companies might be affected because dividends were not earned in some of these years.

Exhibit X-129 purports to show percentage of profit to American Telephone and Telegraph Company on stock holdings in Illinois Bell in comparison with percentage of profit to American Telephone and Telegraph Company on stock holdings in other licensee companies. The comments made with reference to Exhibit X-128 as to the manner of calculating the profit ratio and the use of the word "profit" also apply to this exhibit.

Exhibit X-132 contains the same inaccuracy in respect to average loans which has been referred to in the record in connection with Exhibit X-151. It also combines what purports to be profits to American Telephone and Telegraph

Company on its stock holdings with losses to American Telephone and Telegraph Company on loans to associate companies to bring down a net profit to the American Telephone and Telegraph Company. This procedure commingles two very different things and does so in varying degrees with respect to the numerous different companies involved. The relation of the American Company to the associate companies evidenced by its capital stock holdings is an investor relationship, and the book value of the stock investment is not the same as the worth of the investment. [fol. 7106] The loans made by the American Company to the associate companies are advances, a class of relatively short-term financing, and the American Company in connection with them sustains a credit relationship to the associate companies. In some cases the associate companies paid no dividends; in some cases they obtained no loans. The ratio of outstanding loans to book value of American Telephone and Telegraph Company stock holdings varies considerably in the different companies and in the same company at different times. It appears to me the exhibit does not use the words "net profit" in the ordinary sense of the term.

Exhibit X-133 purports to show the average return to the American Telephone and Telegraph Company from dividends and interest on its investments in licensee companies. The purported investment to which reference is made in this exhibit is merely the sum of the American Company's book value of stocks of associate companies owned and the outstanding loans which it has made to licensee companies. Also the sums used in the preparation of this exhibit are incorrect, because based on the erroneous figures for loans referred to in the record in connection with Exhibit X-131.

Exhibit X-134 takes the average return to the American Telephone and Telegraph Company from dividends and interest on stocks and loans in associate companies and converts such average return into a so-called average return to stockholders of the American Telephone and Telegraph Company on their investments in capital stock of the American Telephone and Telegraph Company. The average loans used in these computations are incorrect for the reason pointed out in connection with Exhibit X-131, and the method of stepping up the investment to the stockholders is incorrect for the reason pointed out in connection with Ex-

hibit X-127. This exhibit contains three of the matters which I have previously referred to as incorrect.

Exhibit X-135 contains incorrect figures representative of average loans and it also confounds the investment relationship and creditor relationship of the American Tele- [fol. 7107] phone and Telegraph Company with the Illinois Bell. On line 5 of this exhibit items are starred, indicating losses. The fact is that the American Company received substantial returns on its investments referred to on this line and the existence of red figures is due solely to the peculiar manner of computation adopted in the exhibit.

Exhibits X-142 and X-143 cover the same general subject matter, except that on X-142 dollars are shown, whereas X-143 deals with percentages and with dollars per average station.

Using Exhibit X-143 and the Indiana Bell Telephone Company for convenience of illustration, a purported showing is made that because the Indiana Company was yielding a low return during the early years of the period involved in the present Illinois Bell rate case, the amount of the license contract payment from the Illinois Bell to the American Company should be reduced or the license payment of the Indiana Bell should be increased to 18 per cent. The derivation of the 18 per cent is as follows: In Exhibit X-130, under the heading "Indiana Bell Company" and year 1923, the amount required to equal average Illinois Bell Telephone Company return on capital stock is shown as $863,796. In Exhibit X-137, the above amount is added to the outstanding loans of the American Telephone and Telegraph Company to the Indiana Bell Company upon an incorrect average quarterly rating, and the figure is thereby increased to $1,111,829.

On Exhibit X-142, the American Company's license revenue from the Indiana Bell for the year 1923 is shown as $363,065. Dividing $1,111,829 by $363,065, the product is 306.24 per cent, which is stated on Exhibit X-143 to be the amount required to equal average Illinois Bell Telephone Company return on investment expressed as a percentage of the Indiana Bell Telephone Company's license payment. Adding 100 per cent of the Indiana Bell Telephone Company's license payment to this percentage, we obtain 406.24 per cent, and 406.24 per cent of the 4.5 per cent license contract payment in effect in 1923 produces a hypothetical

[fol. 7108] license contract payment requirement of about 18 per cent for the Indiana Bell Company.

Exhibit X-144 contains percentages which are the same as those shown opposite the words "Balance available for additional return to American Telephone and Telegraph Company" as shown on Exhibit X-143 just referred to.

Exhibits X-148, X-149, X-150 and X-151 are related exhibits. Exhibit X-148 confuses a showing of total costs for the American Company with a showing of costs assignable to licensee companies. The comparison in this exhibit is misleading because the line "Balance available for additional return to the American Telephone and Telegraph Company" does not set forth the same elements under the heading of totals as it does under the heading Illinois Bell Company.

These exhibits assume that inasmuch as the American Company's presentation of its total costs under the license contracts includes losses on loans made to the companies for temporary financing, whereas the costs which the company has assigned to the Chicago area include no such costs, it is fair to compare the Chicago area costs, exclusive of such losses, with the remainder of the costs of the American Company under the license contracts inclusive of such losses. This is incorrect for the reason that the losses on loans due to temporary financing were excluded from the showing for the Chicago area, not because there were no such losses, but because the Company claimed no amount under that heading and if a statement were made for any or all of the other license companies on the same basis, no claim would be therein made for such losses. That is, the effect of these exhibits is based on the fact that in Mr. Heiss' exhibits he claimed as apportioned to the Illinois Bell no part of the losses on temporary financing. The first column was the American Telephone and Telegraph Company side of the picture and it showed certain losses. I do not know what these exhibits are designed to do, but I know that they do not make a fair comparison.

Exhibit X-279 computes a percentage by dividing undi- [fol. 7109] vided profits of associate companies by American Telephone and Telegraph Company book investment in stocks of associate companies plus the amount of loans made by American Telephone and Telegraph Company to such companies.

Exhibit X-280 is a companion exhibit to X-279, and takes the percentage derived in X-279 and converts it into an average return to stockholders of the American Telephone and Telegraph Company on their investments in capital stock of American Telephone and Telegraph Company. The investment of such stockholders in American Telephone and Telegraph Company stock is assumed in this exhibit to be the par value of stock regardless of capital stock premiums or surplus.

Exhibit X-285 purports to be a comparison between dividend payments of the Illinois Bell to the American Company with dividend payments of other companies to the American Company. It is just a comparison of dividend payments without regard to the earnings of the companies. It has nothing to do with earnings, as I read it. The figures that are shown on Exhibit X-131, of which we have had some discussion concerning the seven million and the twelve million, are used to develop the figures on Exhibit X-136, so any error in Exhibit X-131 is carried into X-136 by the identity of the method with respect to the matter that we have been talking about.

Cross-examination.

By Mr. Goldstein:

I understand that Mr. Heiss stated that you could not tag the dollar. All of the funds of the A. T. & T. go into one pot and in any calculation involving the average cost of funds of the American Company you draw the same proportion of bonds, stock, premiums, and bonded debt funds for specific investment the same as the whole.

It uses that hypothesis. I do not see any connection between that hypothesis and Mr. Rainwater's exhibits. I did not find that he changed that hypothesis. He has used the same average cost of funds that Mr. Heiss has used and [fol. 7110] the same ratio of bonded debt, premiums, and capital stock that Mr. Heiss used, applied to the total funds.

If you had $1,000, $500 of which came from credit obligations, $250 came from surplus and premiums, and $250 from capital stock, you would have your total fund of $1,000 composed one-half of bonded debt, one-quarter of premiums and surplus, and one-quarter of capital stock.

"Q. Now, suppose out of that $1,000 you took $500, and you put it into an investment in telephone instruments, and

you wanted to figure what your return was on that $500, and then you wanted to divide up that return, or the return on the $500, to the return on the portion which came from capital stock. Your $500 then would be, one-half came from bonded debt, one-quarter would come from premiums and surplus, and one-quarter would come from capital stock; and so you take your earnings on the $500, and you would deduct that portion applicable for interest on the bonded debt, and you would have the balance available for the stock, would you not?

"A. Well, answering the last part of the question, whatever earnings you would have, out of them you would provide for bond interest, and the balance would be available for return on stock.

"Q. And in figuring $500 was stock, you would take one-quarter of the $500 as being applicable to stock, would you not, because your total had a quarter of stock, one-quarter of premiums, and one-half bonded debt?

"A. Observing the definition of stock as given in the question that is correct."

If you have $1,000, and $500 came from bonded debt, $250 from surplus, and $250 from common stock, the ratio would be one-half, one-quarter and one-quarter. If you varied that $1,000 so that its composition was $1,000 composed of $500 bonded debt, $300 of surplus and premiums, and the balance in common stock, the ratio of each of them would be different to the total. Whatever the ratio is of your total funds, if you maintain the ratio, when you take a portion of the total fund and invest it in a specific investment, you [fol. 7111] always have a proper basis of comparison between your return on the whole and your return on the part, and even though your theory about the whole may be wrong you get a consistent comparison.

"Q. If the American Telephone and Telegraph Company set up a standard to show the effect of its total operations, that is, that after payment of expenses it could build ten office buildings during the year on the profits of its total operations, and you wanted to show the effect from part of its operations, if you adopted that standard of comparison, whether the part of its funds would produce a profit which would enable it to build more than the ten office buildings, you would have a proper basis of compari-

son between its total operations, and the part, would you not?

"A. That is equivalent to saying that if you make this assumption with regard to the ten office buildings to the total, it is then fair to assume the same thing regarding one office building."

The fact that the basis of ten office buildings might not be the proper standard of comparison for prosperity as a general proposition, would not affect the comparison between the whole and the part; I would hope for equal prosperity on one building.

"Q. Now, did Mr. Rainwater do any different when he used the return to the American Telephone and Telegraph Company on its total operations, and he took the figure of return for the telephone instruments from part of its funds, using the same basis of ratio as Mr. Heiss did?

"A. No, I understand that both of these gentlemen assumed that you cannot tag the dollar."

I have a quarrel with Mr. Rainwater as to whether he has made a correct computation, to get from 39 per cent to 59 per cent on the assumption that every dollar of the funds invested in telephone instruments put in by the American Telephone and Telegraph Company, had the same source, in the same ratio as Mr. Heiss used in Exhibit A-164.

"Q. Well, now, Mr. Crunden, will you please, to save time this morning—I have put down on paper the compu- [fol. 7112] tation which you stated to Mr. Blackman, showing—appearing in Exhibit X-127—also the method used in Exhibit X-111; and I have also put down the method by which you would arrive at the $10.44 for the year 1930, in the annual reports of earnings of the American Telephone and Telegraph Company. I have also listed the source of all of the figures. For our purposes will you please assume that these figures are taken correctly from the source stated. I am now interested in determining whether the same identical mathematical computation would be used to arrive from 7.21 for the total return of the American Telephone and Telegraph Company from all of its operations on its entire investment, to 10.44 on its stock, on its average stock outstanding, as shown in its annual reports; and comparing that method with the

mathematical computations used in Exhibits X-127 and X-111; and when I have finished the questioning, I will defer cross-examination, and Mr. Rainwater will help you, and it will only take about five minutes to check the mathematics, to see whether the mathematics are the same in each of the three cases. So will you just please hold that—and that is Exhibit 438—X-438."

Exhibit X-112 is not on a comparable basis because it refers in part to actual results in respect of instruments, and then introduces calculations regarding what might be the condition if the company were getting depreciation and 8 per cent return on reproduction cost. As to whether I am complaining about the mathematics or the purpose of the exhibit: I suppose when you come down to it, I am primarily noting the language of the side headings because it says "Per cent of total return on investment" and there isn't any such thing. I am not criticizing the mathematics. In Exhibit X-128 and the other exhibits where I talked about "profits" it is perfectly clear as to what was meant by the term "Net Profit." In reading the exhibit, you would know from reading it that it meant transferred to surplus. There was no attempt to sneak up on the company or on the Court, on that point. My criticism about it is that it is not the net profit because you haven't any profit. [fol. 7113] I am not objecting to the definition stated there. Its just like persimmons; if you like that sort of "net profit" that is all right, take it, and God bless you.

You will have to ask Mr. Heiss whether, when, in his license contract exhibits he put in the cost of holding funds, those funds that he claimed were being held, were being held for both loans and stock. I am generally familiar with Mr. Heiss' exhibits in this case. My understanding is that the item "Cost of holding funds" as used in all of the Heiss exhibits had reference to the loans and not to the stock.

I am familiar with the item "Cost of holding funds" set up by Mr. Heiss. You will have to ask Mr. Heiss whether those funds being held by the American Telephone and Telegraph Company were to make advances, or were to make advances plus buy stock. I do not know then the purpose for which those funds were being held. Without that knowledge I can criticise Exhibit X-129 because X-129 is wrong.

If the item "Cost of holding funds" developed to be the cost of holding funds for stock purposes as well as making loans, that item of cost would not be wrong for the same reason that I have said that Exhibit X-129 would be wrong. We are talking about different things.

"Mr. Goldstein: If those funds were being held by the American Telephone and Telegraph Company, and there was a direct subscription without any loan advances, would the cost of holding those funds be a proper charge in the license contract?

"A. From the time that they decided that the company would finance through stock, until the time the money was paid for the stock, it would not have anything to do with the license contract. It would be an investor relationship.

"Q. And if the Illinois Bell in November of one year, not having any loans at all from the American Telephone and Telegraph Company, should notify the American Telephone and Telegraph Company that in the year 1924 for [fol. 7114] instance the American Telephone and Telegraph —the Illinois Bell would issue some stock to the American Telephone and Telegraph Company, and the American Telephone and Telegraph Company were holding funds from January 1 of that year until the date of the subscription, you would say that the losses on holding those funds were not a part of the license contract cost?

"A. I would not be able to express an opinion on that without going thoroughly into Mr. Heiss' exhibits."

I would have to see the exhibits, and know the circumstances before I gave my opinion as to whether it would be a proper charge.

"Q. I am just putting this transaction to you, that in November, 1923, the Illinois Bell Telephone Company, in its provisional estimate notified the American Telephone and Telegraph Company that in the year 1924 it would not borrow any money, but it would issue $20,000,000 of stock, and in November—in October or November, 1924, it did issue that stock and the American Telephone and Telegraph Company purchased that stock.

"Now, the American Telephone and Telegraph Company held the funds from January to October, the date of subscription. Would the losses on those funds be a proper charge under the license contract?"

If the American Company in order to have that money available ten months later for the convenience of the Illinois Bell Company, were required to carry it for that time, I should say it would be. Or if there was not a firm arrangement, and it was possible for the Illinois Bell Company to change its mind and say, "We have decided we will not issue that stock; we would rather take some more advances," then, I can see that there is a connection. Even though there were no advances and even though they told them that they would take no advances during the year, they can change their minds on five minutes notice. There is no certainty that because some president ten months in advance says he thinks he will issue stock, therefore, he is going to absolutely issue the stock.

[fol. 7115] I can conceive that there might be circumstances under which even holding funds to buy stock to enter into an investor relationship, is a proper charge. But I would like to study the circumstances, because there might or might not be stock purchased.

In connection with Exhibit X-134; the American Telephone and Telegraph Company has in its possession all of the figures of actual interest paid by the licensees. It has no figures of average loans, because we do not need that in our business. Anyone by having the amount of interest, could obtain the average loans on a true daily basis by dividing by 5.88. The American Company, of course, knew what the interest was and that could have been obtained, if defendants wished it, from the books of the American Company.

Exhibit X-143 is not carried into all of the other exhibits. Of course, it does not carry into all of the other exhibits.

In connection with Exhibit X-148: Under the license contract all of the licensee companies do not get the right to make loans from the American Telephone and Telegraph Company. It does not set that up in the license contract. It says that the American Company will give them such aid and assistance as is within its power, in financing, or words to that effect. Actually, making these advances has been the form that much of the assistance has taken.

The American Telephone and Telegraph Company, in performing that function, has had certain losses, which Mr. Heiss shows under license contract costs for the company as a whole. The Illinois Bell, in some years, got advances from the American Telephone and Telegraph Company.

"Q. Now, you say because Mr. Heiss in his exhibits in this case did not include as a charge against the payment of the Illinois Bell, these losses on loans actually made to the Illinois Bell, therefore the defendants have no right to make a comparison of the fairness of the license contract by showing that the other companies have a substantial—get a substantial benefit, and the American Telephone [fol. 7116] and Telegraph Company incurs a substantial loss, in making these loans, is that it?

"A. I have made no statement tending to circumscribe the rights of the defendants."

I did not say I was criticizing the exhibit on that basis. I said that with respect to the Illinois Bell there was nothing included for losses on loans. That all of the losses on loans were thrown down into the total, so that you are comparing two things that are not the same. Mr. Heiss, in the first column of his exhibit had a statement, of course, from the standpoint of the American Company. In the second column he had certain costs which various witnesses had assigned to the Chicago area. In the second statement there was nothing for losses on loans. Now, this statement compares those two columns blandly, as if they were comparable, and you have got to study the exhibit to find out if that is the case. I am simply drawing attention to it.

My criticism is not because Mr. Heiss did not include in his exhibit any losses on loans, and that defendants included it as to the rest, but my criticism is that this exhibit compares two things that are not the same.

Now, the two columns of Mr. Heiss' exhibit are not the same, as everybody can see by looking at it. Now, here is a lot of exhibits which are as much alike as Chinamen, and I am simply taking one of these complicated exhibits, and finding out a certain fact, which I take it you and I both are in agreement on, that in this section relating to the Illinois Bell, there is no item for losses on loans, financing, but in the total there is an item and that item is the total of all those losses.

Redirect examination.

By Mr. Blackman:

With regard to that example which was given to me by Mr. Goldstein, of the $1,000, of which $250 was represented

by stock, $250 by stock premiums, and $500 by loans or mortgage investments: If the corporation had $10 available for return on the stock, and had $250 stock outstand-
[fol. 7117] ing, you would divide the $250 into $10, and that would give you 4 per cent. That would be 4 per cent on the stock. The return to the investor on his investment in the stock would be one-half that. The way Mr. Rainwater has figured it, it would go just the other way, and be twice that.

W. F. Sloan, a witness on behalf of the plaintiff, resumed the stand, and testified further, in rebuttal, as follows:

Cross-examination.

By Mr. Goldstein:

July 1, 1932.

In making up Exhibit A-243, I used the data that Mr. Cummings had put into the record. I used some other data on pole lines, of course; I found from the vouchers the number of tank-treated poles, I used that data. For cable footage, I took Mr. Cummings'. For the prices that were used as of June 30th I took Western Electric prices. I don't know how much time it took us to make up the study. We were doing so much work, after we got Mr. Cummings' exhibits; I suppose we have had them two months, or more. I have been working continuously on this and other exhibits, but not with all of our force. We had three or four men, and then we made use of some of the Company's employees in addition. The number of Company employees varied. I don't know. Some days we would have two or three and sometimes four or five. I could look up that data. Well, I would say we had, most of the time we had about three of our own people, besides Mr. Cook and myself and two or three of the Company's people, three or four.

Exhibit A-249 is practically the same as the other, except that it has the additional correction for the productive hourly rate, so the same general data was used, and there we did make use of some additional data that was not contained in Mr. Cummings' exhibits. The productive hourly rate for the last six months of 1923 we had to get from the
[fol. 7118] same source that Mr. Cummings got the data for the first six months. That is practically the only difference.

Much the same general type of answer would apply to

Exhibit A-251 as to the other concerning sources. That also includes specific estimate performance. I used the same general sources as I used before.

Exhibit A-251 was finished day before yesterday. Exhibits A-249 and A-243 were finished some days prior to that.

On the second to last page of the copy of Exhibit A-252, delivered to defendants, the last sentence, "J. G. Wray also lists the same estimate twice in two different instances on this page", appears. That should have been stricken out. The tabulations on those two pages where these words have been stricken out are based on the supposition that the duplications existed. That would not be affected very greatly, however, because one of those estimates only involved $300, and I have forgotten how much was involved in the other, but it would not change the general result of that very much. Perhaps it would change it slightly.

In my testimony I stated: I have ascertained whether the poles included in this two and a half year period of Mr. Cummings' exhibit, were in part tank-treated poles. I obtained this information from the Western Electric Company invoices. All of those vouchers pertain to Chicago area only. They don't show which were placed in the Toll Pole Line Account, and which in the Exchange Pole Line Account, but the facts are there were not many poles in the Chicago area. They do not show what poles were placed at all, but they were bought for Chicago, and evidently used in Chicago. I assumed they were used in the Chicago area. There might be a variation of three or four or a dozen poles that did not go in, but if you take the two and a half year period for the purchases, it is perfectly obvious those poles were used in Chicago.

The A. N. A. cable replaced the earlier N. A. and T. A. cable about June 1, 1923; that is when it first appeared in the catalogue. The difference between the A. N. A. and the [fol. 7119] N. A. and the T. A. cable was a detail of manufacturing. In general, they serve about the same purpose.

In Exhibit X-6 Mr. Cummings did not use the productive hourly rate as of June 30, 1923. That is the point of our objection. He used it for the first six months of 1923. He used the average for the first six months of 1923. He may have thought he was using the hourly rate for the six months ending June 30, 1923, to develop the hourly rate level as of June 30, 1923, but he didn't. He took the average productive hourly rate for the first six months. He used the

hourly rate for the first six months of 1923 to convert all of the gross expenditures for the years 1921, 1922 and the first six months of 1923 to that extremely low level. Not to the level as of June 30, 1923; that is the point, he didn't. He used it for the first six months of 1923, which is entirely different from the June 30th level. That is the point of our objection.

He said he was developing a June 30th level, but he corrected it by—well, I will tell you how much he corrected it. He corrected it from 90.78 to 90.79 in the Pole Line Account, 1/100 of 1 per cent.

Approximately one-third of the total labor cost of setting the pole is digging the hole.

I criticized Mr. Cummings' application of trial units for main cable only to a composite group of cable consisting of main and subsidiary, and I stated as follows:

"So he applied his correction factor against all of the sizes indiscriminately, and it is, of course, perfectly obvious that the correction factor should have been applied against the size that belonged to the subsidiary group."

You would have to approximate these sizes from the records of the Illinois Bell showing which were main and which were subsidiary cable. But the way Mr. Cummings used it was entirely improper. You can approximate it very closely.

[fol. 7120] Redirect examination.

By Mr. Thompson:

In the preparation of the exhibits which were introduced during my rebuttal testimony I used nothing whatever except the records of the Illinois Bell Telephone Company and Mr. Cummings' work sheets.

Reference has been made to certain types of cable which first began to be used in 1923. In Exhibits A-2 to A-10, both inclusive, I reproduced the actual types of cable that were in the plant from year to year.

. . . . . .

[fol. 7121] Allan B. Crunden, a witness on behalf of the plaintiff, having been previously duly sworn, resumed the stand and testified further in rebuttal as follows:

Cross-examination (continued).

By Mr. Goldstein:

I have not checked all of the calculations on Exhibit X-438 because they are numerous, but I have checked enough of them to understand the exhibit for the purposes of the comparison.

"Q. Are the mathematical calculations on pages 1 and 3 the same, to arrive at the result in page 1, from 7.21 to 10.44 for the entire Company investment, year 1930, to arrive from 7.67 to 11.24 in the last column on page 1, and to arrive from 32.15 to 59.52 on page 3, in the case of telephone instruments for the year 1923.

"A. As mere mathematical computation.

"Q. Yes.

"A. Regardless of captions, or anything else.

"Q. That's right.

"A. Just the comptometer operation, that is correct.

"Mr. Goldstein: Yes. I would like to make one correction, a typographical error. The item D on page 2, which reads "Capital stock investments" should read "Capital stock installments".

"A. Yes. I have not checked all these details on page 2. I will change this word to "installments".

(Defendants offered in evidence Exhibits X-436, X-437 and X-438. Received.)

Redirect examination.

By Mr. Blackman:

The terminology on X-438 is not the same as that used on X-111. On sheet 3 of X-438, the last item reads, "Per Cent return expressed on capital stock par value 59.52". That is a correct development of the amount which he purports to develop under the assumptions contained in the previous lines of the exhibit. In connection with the same figure, [fol. 7122] 59.53, on Exhibit X-111 the wording is "Per cent of return on investment expressed in per cent of return to A. T. & T. stockholders on the average capital stock investment". Those are by no means the same things at all.

Recross-examination.

By Mr. Goldstein:

If he had put in per cent of investment expressed in return on capital stock par value it would have made page 1

wrong in the same way that page 3 is wrong. Then the 10.44 would have been wrong as applied to the heading that you proposed to be used.

"Q. And when the American Telephone and Telegraph Company told its stockholders that the earnings were 10.44 on capital stock, do you consider that that was an expression of return on investment expressed on capital stock par value or not?

"A. No, I don't think the word "investment" comes in there at all in that connection.

"Q. You did not consider that the 10.44 was a return on investment?

"A. No."

Redirect examination.

By Mr. Blackman:

The word "investment" is a generic term. The 10.44 represents the relationship between the earnings of the company and the par value of the stock or shows the earnings per share. It takes no account of the fact that much stock was issued at a premium. Some of the stock was issued at 180. It takes no account of the fact that there is surplus invested in the business to provide part of the earning power which is reflected in this 10.44.

Recross-examination.

By Mr. Goldstein:

"Q. And by that you mean that 10.44 would cover not only the return for the money put in to form the capital stock, but also surplus and premiums.

[fol. 7123] "A. The 10.44 is the per cent return figured on the par value of the capital stock.

"Q. But that is the total return that the stockholder would get on his entire investment, capital stock, premiums and surplus.

"A. Well, you are talking about it as if you could transmogrify a percentage from one base to another, and you cannot do that. If you say there is 10.44 per hundred dollars of par value of capital stock, and that is all that the business gets, that is all right. But we have got a percentage that we are dealing with here. That percentage represents the amount of earnings available for the stockholders for whatever investment they had, including the

stock premiums and surplus, as related to the par value of the stock.

By the way, that exhibit is headed up "A. T. and T. Company", and then it goes on to say, "Use of a conversion factor", and so forth. I think it ought to be made clear that the American Telephone and Telegraph Company never used that conversion factor.

Redirect examination.

By Mr. Blackman:

The American Telephone and Telegraph Company does not use any such formula as appears on the sheet 1 of X-438. It is not necessary. All it does it to say, "Our net income is so much, we have so many shares of capital stock, and that amounts to so much a share". That is 10.44. And that is shown on that exhibit.

A great deal of that stock was paid for at $180 a share. The investment of the man who bought that stock was not $100, but $180. What is done in X-111 is to proceed as if the investor had paid only $100 for his stock.

"Mr. Bracelen: Counsel states that that completes his cross-examination of plaintiff's witnesses on rebuttal. One of my associates suggests that I should broaden the offer I made a moment ago to cover all exhibits that have been iden-
[fols. 7124-7274] fied by the plaintiff's witnesses on rebuttal, so that the record will leave that point in no doubt.

"Judge Wilkerson: They are admitted subject to the objections.

"Mr. Goldstein: I want to offer the X exhibits, if the record appears we have made no formal offer, we offer all of the X exhibits, so there will be no question about it.

"Judge Wilkerson: They are admitted."

[fol. 7275] June 4, 1932.

JOHN S. HAGBERG, on behalf of defendants, testified as follows:

Direct examination.

By Mr. Goldstein:

My name is John S. Hagberg. I reside at Highland Park, Illinois. I am employed as a senior accountant by Touche, Niven & Company, public accountants, who have

been established in business for more than thirty years, and who have offices in Chicago, New York and the principal cities in the United States; in Paris, France, and, by association with George A. Touche & Company, London; offices in the principal cities in Canada, British Isles and South America. I have been associated with that company close to fifteen years. Before that, I was employed by different commercial concerns. I went to school in Sweden and then was employed in Germany and came to this coun- [fol. 7276] try about 1902. I am a member of the American Institute of Accountants.

My duties in connection with my employment with Touche, Niven & Company have been auditing and examination of accounts and cost accounting methods of principally larger manufacturing concerns. I have been engaged in installing and revising cost accounting systems of several manufacturing concerns.

I was employed by the City of Chicago on or about January 1, 1932, in connection with the present case. My employment was particularly in connection with the plaintiff's showing of the Western Electric profits and the costs allocated to the Bell and non-Bell business. I was present in the courtroom most of the time when Mr. Gregory testified in this case and I was present when he testified on the matter of Western Electric costs and profits shown in Plaintiff's Exhibits A-77 and A-79. I was present when those exhibits were offered. I have read his testimony.

In connection with my examination of the data underlying these exhibits, I examined the binders referred to by him in his testimony, and the records, and made investigations at Hawthorne and in the New York headquarters of the Western Electric.

Exhibit X-15 entitled "Western Electric Company Profit and Loss, year 1929," was prepared by me and under my supervision with the assistance of the employees of the Western Electric. They are practically all the Company's figures so far as the first two lines are concerned, including the total sales. That is, I was in agreement with the Company on those figures. Under the line "Gross profit" the figures "Basic gross profit adjusted" are also the Company figures shown in the binders or obtained through the assistance of the Western Electric employes. That answer also stands for the allocation between the Bell and the non-Bell and between the telephone apparatus, lead-covered

cable and supplies. Concerning the two lines shown under "gross profit" as "Manufacturing surplus and current underrun" it is necessary to bear in mind that the Western Electric Company, by reason of using standard costs as defined by Mr. Gregory, is required to make adjustments thereto, in order to arrive at the gross profit figure, and these adjustments depend upon standard shop cost of sales as a basis of allocation between Bell and non-Bell busi-
[fol. 7277] ness, and depend upon sales as the basis of allocations between Illinois Bell and the Bell System, as between the Chicago Division and the Illinois Bell as a whole, on Mr. Gregory's basis of allocation in arriving at the net profit in Exhibits A-77 and 79 and A-93 to A-98.

The first line, "Manufacturing surplus and current underrun" shows $17,720,000 in the black. This means that a group of adjustments resulted in additions to the basic gross profits and resulted because the actual expense in regard to labor cost, material cost and overhead combined on the manufactured articles to which they applied was less than the standard or estimated cost for the aggregate of these three cost factors included in the standard costs for the year for such manufactured article.

The second line, "Manufacturing surplus and current underrun, $15,247,000," in the red means that another group of adjustments resulted in deductions from the basic gross profit and resulted because the actual expense in regard to labor cost, material cost and overhead combined on the manufactured articles to which they applied, was more than the standard or estimated cost for the aggregate of these three cost factors included in the standard costs for the year for such manufactured articles.

The next two lines, "Inventory revaluation and reserves," show on one line in the black $122,000, and in red, $6,747,000. That means that to the standard inventory valuations which the Western Electric uses as the first step in valuing the inventory at the beginning and end of each year, the Western Electric Company made a group of additions and a group of deductions to arrive at the inventory value of cost and market, whichever is lower.

The detail showing manufacturing surplus and current underrun and the inventory revaluation and reserves will appear in statements which will be offered by me as Defendants' Exhibits X-16, X-17 and X-18.

The figures under "Total" from the four lines following "Basic gross profit," represent an aggregate of the adjustments and were taken from the binders, and in agreement with the Company's employees. So, also, the figures shown in the columns under "Total" for the telephone apparatus, lead-covered cable and supplies were taken from the binders, and were in agreement with the employees of the com-
[fol. 7278] pany. The binders did not show, in each case, where the allocations of adjustments were made to Bell and non-Bell. They did not show in each case the gross additions that were allocable to Bell and non-Bell, and the gross deductions that were allocable to Bell and non-Bell. In many cases the allocation was made of the net result of the certain additions and certain deductions.

To arrive at the gross additions allocable to Bell and non-Bell and the gross deductions allocable to Bell and non-Bell in those cases, I was compelled to make my own allocation.

The figures in the line, "Total gross profit" and the allocation to telephone apparatus, lead-covered cable and supplies, and the division of each class between Bell and non-Bell, are in agreement with the Company's own figures, as furnished to me. All the other figures on that statement both for total figures and the distribution between the classes of product and between Bell and non-Bell, are all taken from the Company's binders, that were furnished by the Company.

The Company's records and the binders as I found them, treat telephone appliances and special products as one class of products, known as telephone apparatus. That is, they treat them as one class in considering the costs and adjustments in their allocation between the classes of products, and not as to sales. In their records, under the main heading of "Telephone apparatus" are included telephone appliances and special commerical products.

Exhibit X-15 shows, that for telephone apparatus alone the total adjustments that were spread over all items of that class were $30,798,000, covering the manufacturing surplus and current underrun, and being the totals of the additions and the deductions. It foots to that amount.

The cost of sales of telephone apparatus in 1929, as shown on Exhibit X-15, by deductions, was $164,350,000. The gross adjustments represented 18.7 per cent of such total cost of sales. The sum total of the adjustments applicable to tele-

phone apparatus and allocable to Bell customers, to be spread among the customers in the Bell System, was $28,414,000, in the year 1929. That represents 19.84 per cent of the cost of sales of telephone apparatus to all Bell customers.

The binders did not show, and the Company employees advised us that it had not been made, and that they had no [fol. 7279] data available from which we or they could determine the adjustments applicable to the separate hundred thousand or more items making up the class "telephone apparatus."

The same answer was made to me with respect to the determination of the adjustments which were applicable to the items which were sold to the individual Bell customers, including the Illinois Bell or the Chicago Division of the Illinois Bell.

With reference to records available to determine the sales of the separate items of telephone apparatus between Bell customers, they advised us that there was no such record of individual items. We went to the Chicago distributing house of the Western Electric Company in order to check the sales figures for the Illinois Bell, and we found that the records showed only the gross billing, and not by individual items.

Exhibit X-15-A, entitled "Summary of Sales," and Exhibit X-15-B, entitled "M-201, Sales and Gross Revenue," were given me during my investigation at the Chicago distributing house to show the sales were broken down, and what classes. That is on form X-15-A. On the form marked X-15-B, these findings are just summarized, but individual items of manufacture are not segregated on these forms, nor are the sub-classes making up these main classes divided up.

We only have the main headings of apparatus and equipment, lead-covered cable, supplies materials, transportation, service, and what is called general sales. They are somewhat broken down, but not as to items or sub-classes of items.

What I said with reference to the manufacturing surplus and current underrun was equally applicable to the figures for inventory revaluation and reserves, and their distribution between the Bell and the non-Bell customers and between the various Bell customers in the Chicago division and the Illinois Bell.

Exhibit X-15, shows the gross adjustments of thirty millions. The exhibit also shows that for manufacturing surplus and current underrun for telephone apparatus, the net adjustments, were only $2,736,000 additions to profit, or 1.66 per cent of costs of sales of telephone apparatus. That is the difference between the two lines, the black figures and the red figures. And this exhibit also shows that there were $946,000 net adjustments by way of additions to profits from [fol. 7280] Bell apparatus, or 66/100ths per cent of the cost of sales of telephone apparatus to Bell customers. The net adjustments which depended on the standard shop costs as a basis of allocation, if they represented the total adjustments, would have a negligible effect on the profits on sales to any or all customers, but it would be as erroneous to consider the net figures in this instance as it would be to say that because the control account of a ledger of account receivable was out of balance with the detailed accounts by one cent, the errors resulting therein would not be harmful even though the one cent error was the net result of overstatements and understatements in each customers' account aggregating for some customers thousands of dollars one way or for other customers thousands of dollars the other way. I found that the adjustments were apportioned between Bell and non-Bell business, partially by direct allocations and partially on the basis of standard cost of sales. I found, in cooperation with the Western Electric employees, that the adjustments applicable to special commercial products were allocated, in part, by direct allocation and in part by standard costs of sales.

The allocation of special commercial products was on the basis of studies, but a large percentage of adjustments were allocated on the basis of standard cost of sales.

Exhibit X-16 is entitled "Analysis of Basic Gross Profit, Year 1929." That is merely detail making up the basic gross profits, and was compiled from the binders, with the assistance of the Company, and is self-explanatory, and gives in complete form the figures which Mr. Gregory testified to. In Mr. Gregory's testimony, some of the items were not mentioned. What I have done is to complete them, and get in agreement with the Company on it.

Exhibit X-17 is entitled, "Manufacturing Department—Surplus and Current Underrun, Year 1929." That also represents the detail making up the additions and deductions

from the gross profit for the manufacturing departments surplus and current underrun, and was made from the binders, with the assistance of the Company, and was prepared, as I have previously explained. In X-17 I show in the margin "D-80." That indicates, in each case, the particular adjustments which Mr. Gregory included in compiling the exhibits which we have identified as D-80, and to [fol. 7281] which he made reference as bearing upon the .2 of 1 per cent calculation. We earmarked those items by putting "D-80" in front of them, in the margin.

Exhibit X-17 shows that there are adjustments in the several factories, in the distributing houses, and in the merchandising department, and that the adjustments which in one department of the business and at one location result in additions to gross profit, in another location and department of the business result in deductions from the gross profit. It also shows that the adjustments which add or subtract from the gross profit for telephone apparatus and lead-covered cable are different in the same department of the business and in one location from other locations and departments of the business. Take, for instance, at Hawthorne, the telephone apparatus showed an addition adjustment for shop surplus in production of $4,575,000 and the lead-covered cable showed an addition of $804,000, but at Kearney it showed a deduction of $6,636,000 for telephone apparatus but an addition of $458,000 for lead-covered cable.

Exhibit X-18 is entitled "Inventory Revaluation and Reserves, year 1929." That represents the detail of the items, inventory and revaluation reserves, shown in X-15, and these items were explained by Mr. Gregory; but X-18 is the complete statement compiled from the binders, and with the assistance of the Company, whereas, Mr. Gregory just testified to certain of the items.

This again shows the variations in amount and character of adjustment at the different locations and different departments.

Exhibits X-19 to X-25, inclusive, represent, for the years 1924 to 1931, profit and loss statements corresponding to profit and loss statement X-15 for the year 1929. The details for each of these exhibits for the years 1924 to 1931, other than 1929, corresponding to Defendants' Exhibits X-16, X-17 and X-18 for the year 1929, were prepared, and a type-

written copy for each of the details, for each of the years 1924 to 1931, inclusive, were furnished to the plaintiff's attorneys.

Exhibits X-19 to X-25, X-19 being the profit and loss statement in the year 1924, X-20 being the profit and loss statement for 1925, X-21 being the profit and loss statement for 1926, X-22 the profit and loss statement for 1927, X-23 the [fol. 7282] profit and loss statement for 1928, X-24 the profit and loss statement for 1930, and X-25, profit and loss statement for 1931, were all prepared in the same manner, and with the same assistance of the Company's employees as described in connection with Defendants' Exhibit X-15.

Exhibit X-26, entitled "Profit and loss statement for 1916," X-27, profit and loss statement for 1917; X-28, profit and loss statement for 1918; X-29, profit and loss statement for 1919; X-30, profit and loss statement for 1920; X-31, profit and loss statement for 1921; X-32, profit and loss statement of 1922; X-33, profit and loss statement for 1923, —were prepared from the binders and with the assistance of the Company and under my supervision.

In my examination of the binders, I did not find any distribution or any data from which a distribution could be made of the gross adjustments between Bell and non-Bell business for the period 1916 to 1923. The only distribution we could find was the distribution of the net adjustments as between Bell and non-Bell, that is, the net figures, which are the net figures of gross profit, they are divided between Bell and non-Bell, but the details making up the basic gross profit and adjustment, were not available. I have requested the Company to give me the data from which could be determined the allocation or adjustment between Bell and non-Bell. That request has been with the Company for quite a while. I will add to that, that we were told that there was no data available in that respect, except that we could perhaps, if they were still in existence, obtain them at the locations at the Hawthorne plant and also the distributing houses.

Wherever they were applicable to, and where the Company was doing business or operating at that time, the data on which a split could be made might be available, but they were not sure whether it was or not, or whether it was even in existence.

I did not make any allocation for these years in Exhibits X-26 to X-33 between the non-Bell and Bell business. Defendants' Exhibit X-34 is entitled "Gross Profit." That consolidates, on two sheets, the additions to Gross Profit [fol. 7283] and the deductions from Gross Profit, total adjustments to Gross Profit, and not adjustments to Gross Profit; and all of the figures on X-34 are taken from Exhibits X-15 and X-19 to X-33, both inclusive.

Exhibit X-34, entitled "Summary Sheets Showing Gross Profits and Adjustments by Years 1916-1931; both inclusive," is intended to show in summary form the additions, deductions and total adjustments, and the result on the net. Exhibit X-35, entitled "Gross Profit and Analysis Summarized 1916-1931," groups the additions and deductions to Gross Profit, the total adjustments, and the net adjustments shown in X-34 according to the period of years. X-35 shows the extent to which adjustments for telephone apparatus separately, also lead-covered cable and supplies separately, each increased the profit and decreased the profit, how they offset each other over a period of years, as indicated.

The third group of figures on the page entitled "1916 to 1923, Inclusive" shows that for the eight years of that period 1916 to 1923, there was a total of $23,724,000 of adjustments. That shows adjustments which added $23,724,000 to profits found in the column "Total." It shows $84,169,000 deductions from profits. It shows total gross adjustments of $107,893,000, and with those adjustments, the additions and subtractions, did not offset each other by $16,445,000, the deductions from gross profit being in excess of the additions by that amount. These totals were broken down on the sheet to show, separately, for telephone apparatus, lead covered cable and supplies, and also each of those total adjustments for each of the separate classes of product, are broken up into those adjustments which come under the category of manufacturing surplus and current underrun, and those that come under the category of revaluation and reserves.

I have purposely made this break-down so as to compare the figures shown on this Exhibit X-35 with the figures shown on Mr. Gregory's exhibit, which has been identified as D-80.

The figures corresponding to these which I have just given for the years 1916 to 1923, are shown in each separate grouping for the period from 1916 to 1925, 1916 to 1926, 1916 to 1927, 1916 to 1928, 1916 to 1929, 1916 to 1930 and 1916 to 1931. These dates just given, mean that I started off [fol. 7284] with 1916, and showed the adjustments from 1916 to 1923, and then added another year, and showed the effect of that on the total. Then I showed the effect of the adjustments for 1925, and similarly for each year thereafter, until I reached the total, from 1916 to 1931, inclusive. It covers not only the adjustments, but the total factors in the main groups, making up the gross profit. The years 1923 to 1930, and 1921 to 1930 (shown on page 1) are the same years which were covered by the exhibit prepared by Mr. Gregory in connection with the discussion of the .2 per cent variation in costs, and identified as Defendants' Exhibit D-80.

Exhibit X-35 shows that for the period 1916 to 1931, inclusive, there were adjustments which resulted in additions to profit in the factory of $109,415,000 and adjustments which resulted in deductions of $163,873,000, or total adjustments of $273,288,000. This figure of $273,288,000 is merely the factory adjustments. It is the manufacturing surplus and current underrun, but not including inventory, revaluation and reserves, excepting as they enter into the factory. The standard shop cost of sales is the basis upon which this $273,288,000 of adjustments, are allocated between the Bell and the non-Bell business. They are also allocated on the basis of sales between Illinois Bell and the Bell System as a whole, and between the Chicago Division and the Illinois Bell as a whole.

For the period from 1916 to 1931, Exhibit X-35 shows, that the additions and deductions did not balance out to the extent of $54,458,000, the deductions being in excess of the additions by that amount.

We found that the net differences, in the period from 1916 to 1925, between the adjustments, which increased and the adjustments which decreased the gross profits became greater, and reached the peak in 1925. From 1925 to 1931 the adjustments which lead to additions in gross profit exceeded the deductions, so that by the end of 1931 the net difference between the additions and the deductions declined from $73,884,000 in 1925 to $54,458,000 in 1931, in so

far as the factory profits are concerned. By that I mean, the manufacturing surplus, and current underrun.

For the period 1921 to 1930, which was the identical period covered by Mr. Gregory in his exhibit identified as D-80, [fol. 7285] we found that in the manufacturing surplus, adjustments to standard costs which added to the profits $86,515,000, and there were adjustments which resulted in deductions from profit of $80,664,000, or total adjustments which had to be separated between Bell and non-Bell customers, and between the Illinois Bell and the Bell System, and the Chicago division and the Illinois Bell, of $167,179,000.

Those additions and deductions resulted in a net difference in favor of additions, to the extent of $5,851,000, but this figure of $5,851,000 has no significance whatsoever because the $167,179,000 of adjustments was applicable to different kinds of merchandise purchased by different classes of customers, and some of the customers would be affected by the adjustments which resulted in increase of the net profits of the Western Electric to the extent of $86,515,000, and others by the adjustments which resulted in decrease of $80,664,000.

As the Western Electric prices are based upon the standard costs, and as the standard costs would result in the gross profit before these adjustments, the customers who purchased articles to whose standard costs adjustments were applicable, which resulted in addition to the profits, would have purchased articles from whose sale price the Western Electric would receive $86,515,000 more profits than the Western Electric had estimated at the time when the standard costs were established upon the basis of which the prices were made. Similarly, those customers who purchased articles during the period 1921 to 1930, upon the basis of standard cost to which the $80,664,000 of adjustments resulting in deductions were applicable, would have purchased articles whose prices were based upon standard cost figures, which resulted in profit to the Western Electric in an amount which was $80,664,000 less than the Western Electric had estimated at the time of the establishment of these standard costs upon which these prices were based.

I have made no investigation of how the Western Electric Co. prices are based, except that I have taken the testi-

mony of Mr. Gregory as being correct, that in setting the prices the standard shop costs were taken into consideration.

I have Mr. Gregory's testimony to the effect that in setting their prices, they took into consideration their standard [fol. 7286] shop costs.

(Counsel for plaintiff states that standard cost is one of the factors, but not the sole factor that is taken into consideration in fixing prices of Western Electric Company. Counsel for city stated that if counsel would permit statement to stand he would not further pursue the subject. Counsel for plaintiff agreed to let statement stand.)

I made an examination of the Gregory exhibit entitled "Statement showing the relation of manufacturing department surplus to shop output, 1921 to 1930"—D-80.

That statement purports to show that the aggregate of the adjustments which depend upon standard shop cost as a basis of allocation, 1921 to 1930, and which shows adjustments which increase and adjustments which decrease to the profits for the period from 1921 to 1930, balance each other except as to the extent of $1,833,000 or .2 per cent, the additions being in excess of the deductions by that amount; and for the period 1923 to 1930, the adjustments which added to and which resulted in the subtraction from profits in the factory balance each other excepting to the amount of $6,325,000, the deductions exceeding the additions by that amount; and that the net variation between the additions and deductions for the period 1921 to 1930 represent .2 per cent, and for the period 1923 to 1930, .7 per cent of the output.

I examined the figures shown in Exhibit D-80. I found that Mr. Gregory in that statement used the net figures, and not the gross adjustment figures. Defendants' Exhibit X-36, entitled "Summary of Details of Manufacturing Department, Surplus Items resulting in Net Figures, shown in Exhibit D-80" was prepared by me or under my direction. Defendants' Exhibit X-37 entitled "Summary of Details of Manufacturing Department, Surplus Items resulting in the Net Figures shown in Exhibit D-80 combined in Groups by Series of Years" was prepared by me or under my direction. Exhibit X-36 shows the total additions and the total deductions from gross profit, the total adjustments to gross profit, and the net adjustments to gross profit for each of

the years included in D-80, and only of the items which are contained in D-80; in other words, we have not included in X-36 any additional items of adjustment than those shown [fol. 7287] in D-80, and the purpose of Exhibit X-36 is solely to show the gross adjustments of addition and subtraction from which the net figures are derived which are shown in D-80. X-36 separates the gross adjustment making up the net figures in D-80 and the net figures in D-80 between Telephone Apparatus, Lead-Covered Cable and Supplies. The figures shown in X-36 were taken from the defendants' Exhibits, X-15 to X-35, inclusive. I will compare X-36 with D-80, for the year 1929.

There is a net deduction in D-80 which shows $1,250,000 as a deduction. Now if you will look at X-36, it appears that that $1,250,000 shown in D-80 (which is the same as the $1,249,000 appearing in the column "Total," under the year 1929, net adjustments to gross profit), is the net figure which is the result of a series of adjustments, which resulted in an increase in profit of $9,607,000, and other adjustments which decreased profits to the extent of $10,856,000, or a total of $20,463,000 of adjustments which were spread over the various items sold to the various customers of the Western Electric in unknown proportions.

The figure in D-80, $1,250,000 deductions, appears as shown from X-36 to have been the final result of adjustments which resulted in additions and adjustments, which resulted in subtractions from gross profit in the class of Telephone Apparatus, Lead-Covered Cable and even Supplies in varying amounts, and spread between customers in quantities that were unknown.

The result in D-80 for these years is revealed by X-36 to have been arrived at by the combination of the two large adjustments in the years 1924 and 1925 in Lead-Covered Cable, aggregating deductions of $13,179,000, whereas, in the other years, lead covered cable adjustments were minor, compared with the Telephone Apparatus adjustments.

X-36 shows with reference to the net adjustments in 1921, 1924 and 1925 that those adjustments which represented practically all of the gross adjustments in those years, whereas in the other years they were net adjustments, which represented a small part of the gross adjustments for those respective years.

X-37 groups the additions, deductions, total adjustments to gross profit, and net adjustments to gross profit in pe-

riods in a manner corresponding to that used by Mr. Greg-
[fol. 7288] ory in D-80. X-37 is the first group in the period shown in D-80. The extent of the difference between the adjustments that add, and the adjustments that subtract from profit will be dependent upon the particular group of years which are used in the test. We have set up in X-37 for the years 1921 to 1930, inclusive, as used by Mr. Gregory, additional groupings of two nine-year periods; groupings of three eight-year periods; groupings of four seven-year periods; and groupings of five six-year periods.

Each of these groupings are of consecutive years. From Exhibit X-37 it appears that entirely different results will be shown in each of these groupings, even though the same number of years were used, provided only different consecutive years are taken into account.

It shows that the gross adjustments vary, and the net adjustments will vary, and that the variation between the gross adjustments and the net adjustments may result in one case in additions to profit and in another case to deductions to profit. It also shows that whether you consider one or the other periods, and whether you consider the gross additions or the net additions, the significance is not in the percentage to gross output, but in the number of dollars of adjustments which must be spread among the various items and among the various customers purchasing those items to which the different kinds of adjustments become applicable.

The first group shows gross adjustments of $120,412,000 with a net variation in favor of the additions to the extent of $1,834,000.

That is the first ten-year period. On the other hand, if instead of taking the ten-year period 1921 to 1930, we take the six-year period from 1922 to 1927, we find additions to gross profit of $20,925,000, deductions from gross profit of $30,658,000, or total adjustments to gross profits of $51,583,000, as compared to the $120,412,000 for the ten-year period of Mr. Gregory.

But we find that during the six-year period from 1922 to 1927, the $51,583,000 of gross adjustments resulted in a variation of $9,733,000 in favor of the deductions from gross profit as compared with $1,834,000 shown by Mr. Gregory in favor of the addition out of a total of gross ad-
[fol. 7289] justments of $120,412,000.

For the ten-year period the net adjustment to gross profit is about 1.5 per cent of the total adjustments, whereas, for the six-year period, 1922 to 1927, it is 18 per cent of the gross adjustments.

If instead of taking the ten-year period of Mr. Gregory, which resulted in $1,834,000 of variation in favor of the additions, he had taken the nine-year period, 1922 to 1930, the result would have been that with less than $8,000,000 difference in the gross adjustments between the nine-year period and the ten-year p-riod, the net adjustments for the nine-year period were $5,779,000 in favor of the deductions as against $1,834,000 in favor of the additions in the ten-year period, or a difference of more than $6,600,000 in the net figures from a difference of $7,500,000 in the gross figures.

Defendants' Exhibit X-38 — "Comparison of 'Total Amount of Manufacturing, Inventory and Reserve Adjustments, with amounts thereof included in Exhibit D-80," was prepared by me or under my direction.

It shows the comparison of the total amounts of manufacturing inventory and reserve adjustments with the amounts thereof included in D-80. This shows for each year the total amount of the adjustments divided between the additions and the deductions from gross profits, the total adjustment to gross profit which the Western Electric actually had and the portions thereof of which Mr. Gregory included in his Exhibit D-80.

Defendants' Exhibit X-39, entitled "Division of Operating Surplus, Total Apparatus and Equipment, and Lead-Covered Cable, 1921 to 1930, inclusive" is the sheet which Mr. Gregory furnished as the study which he testified he prepared at the time he prepared D-80 and which was to show that the labor adjustments, taken separately, balanced out during the period, and the material adjustments balanced out during the period and the overhead adjustments balanced out during the period, each separately as well as collectively.

I have checked the figures shown on Exhibit X-39 with the binders and the figures of adjustment furnished by the Western Electric, and shown in Defendants' Exhibit X-36. [fol. 7290] I found that the figures shown in the last three columns of X-39 are in each case net figures and are the result of combinations, of adjustments which increase and

of adjustments which decrease profits. Similarly, the column "Total" is the sum of sub-totals of net adjustments.

For the reasons I have already given, the important figures are the gross adjustments and not the net adjustments, where more than one kind of item is manufactured, and where more than one customer purchases the various items in varying quantity.

The column "Process Merchandise" does not mean "material." It means the account wherein the Western Electric each month carries the labor and material on merchandise is course of completion. Therefore, the figures in the column are the net result of a combination of labor, material and overhead adjustments.

The effect of spreading the combined results of the adjustments to labor, adjustments to material, and adjustments to overhead, between the Bell and non-Bell customers, according to the cost of sales is, that it must be assumed that the cost of the sale of the merchandise sold to Bell customers bears the same ratio to the cost of the sales of the merchandise sold to non-Bell customers, as the adjustments to bring such cost of Bell sales from standard to actual costs bear to the adjustments which bring the non-Bell merchandise to actual cost. Such a condition would only exist if Bell and non-Bell customers bought, during each period, proportionate quantities of each and every kind of merchandise, or in combinations which would bring about the same result.

The effect with reference to the purchases of the Illinois Bell Telephone Company would be that in order that the purchases by the Illinois Bell should bear their proper proportion of the adjustments which are applicable to the Bell System as a whole, as a result of a distribution based upon the ratio of sales of telephone apparatus, lead-covered cable and supplies by the Western Electric to the Illinois Bell compared with the sales to the Bell System as a whole, it would be necessary that the amount of sales of merchandise sold to the entire Bell System bear the same ratio to the amount of sales to the Illinois Bell as the adjustments to bring the standard cost of the merchandise sold to the Bell [fol. 7291] System to actual cost, bear to the adjustments which bring the Illinois Bell standard cost of merchandise to actual cost. Such would only be the case if Illinois Bell and the entire Bell System during each period bought pro-

portionate quantities of each and every kind of merchandise or in combinations which would bring about the same result.

If the amount purchased by the Illinois Bell, or by the Bell System, were changed in any one year to be other than the amounts which the Western Electric actually sold, either by increasing or decreasing the purchases of particular items in reproducing the property on the basis of the prices of any year, the ratios between the Illinois Bell and the Bell System of sales and of adjustments would be entirely different than the ones which would exist under the conditions which prevailed in respect to the purchases actually made in building up the existing property.

Defendants' Exhibit X-40 was prepared by me or under my direction.

It is entitled, "Graph showing variation between standard cost and actual cost of purchases of lead by the Western Electric Company for the Hawthorne Works," and I think the exhibit is self-explanatory.

Defendants' Exhibit X-41 is a graph entitled "Graph showing the variations between standard cost and actual cost of purchases of copper bars by the Western Electric Company for the Hawthorne Works," was prepared by me or under my direction. I have no comment to make on that. I think it is self-explanatory.

Defendants' Exhibit X-42 entitled "Graph showing variation expressed in percentages between standard cost and actual cost of purchases of lead by Western Electric Company for Hawthorne Works"; data taken from Hawthorne M. C. 2.014 reports, was prepared by me or under by direction. That explains itself.

Defendants' Exhibit X-43 entitled "Graph showing comparison between standard cost and actual cost of purchases of copper bars by Western Electric Company for Hawthorne Works" was prepared by me or under my direction. That explains itself.

Defendants' Exhibit X-44 entitled "Graph showing com-
[fol. 7292] parison between standard cost and actual cost of purchases of lead by Western Electric Company, Inc. for Hawthorne Works," was prepared by me or under my direction. It is self-explanatory.

Defendants' Exhibit X-45, "Graph showing comparison between standard cost and actual cost of lead purchases by Western Electric Company for Hawthorne Works per

hundred pounds'' was prepared by me or under my direction. I think it is self-explanatory.

Defendants' Exhibit X-46 entitled ''Graph showing variation expressed in percentages between standard cost and actual cost of purchases of copper bars by Western Electric Company for Hawthorne Works'' was prepared by me or under by direction. I think it is self-explanatory.

Defendants' Exhibit X-47 entitled ''Graph showing comparison between standard cost and actual cost of copper bars purchased by Western Electric Company, Inc., for Hawthorne Works, per hundred pounds'' prepared by me or under my direction. It is self-explanatory.

Defendants' Exhibit X-47A entitled ''Standard Cost per hundred of selected items,'' etc., ''of indicated years for Hawthorne Plant'' was prepared by me or under my direction, and taken from the records of the Hawthorne Plant. That shows merely the dates when these standard costs for the particular items were changed. It is an extraction of selected items from the bulletins of the different years with the dates when they were adopted.

The cost of sales after the year 1925, as they were used in Mr. Gregory's exhibits, and as I used them, included only the cost of sales by the Western Electric, as they left the Western Electric, and not the cost of sales as it left any of the subsidiaries of the Western Electric.

And similarly the cost of sales before 1925 for export or otherwise represented the cost of sales by the Western Electric and not by the subsidiaries, such as the International Western Electric.

(Exhibits identified by Mr. Hagberg offered in evidence. Objections reserved until after cross-examination.)

[fol. 7293] Cross-examination.

By Mr. Thompson:

Whether I am making an apportionment or adjustment with respect to shop variation or other adjustments on gross or net variations and adjustments, I have to have some yardstick to do it by.

In other words, if we have a net shop variation of $1,000,000 and I am going to apportion it, I have to use a yardstick. If we have a gross variation plus of $10,000,000 and a gross variation minus of $9,000,000, we still have to have

some yardstick on which to make that apportionment for both of those adjustments.

I do not mean to say, that any effort was made by Mr. Gregory, or has been made by the Company, to apportion the shop variations or other adjustments between these various Bell Associated Companies, or to the Illinois Bell or to the Chicago area.

What they have done is to find out after these adjustments have been made, what the net profit of the Western Electric Company was on its Bell and non-Bell business, and then made the effort to ascertain what the net profit was on the business done with the Illinois Bell and with the Chicago area respectively.

The Western Electric has conducted a very large manufacturing business during all of the years involved in my exhibits.

Subject to check, the following figures are correct:

The sales of the Western Electric Company to its Bell customers for the period 1916 to 1931 were $2,135,000,000, and to its non-Bell customers, $233,000,000 during the same period, or a total, 1916 to 1931 of $2,368,000,000 worth of manufactures. Out of that total volume of sales of nearly $2,500,000,000, $80,000,000 were special commercial products, leaving $2,288,000,000 worth of sales, 1916 to 1931 by the Western Electric, referring all the time to the Western Electric manufactured articles of telephone apparatus, exclusive of special commercial products and lead-covered cable.

"Q. Now, broadly speaking, this telephone apparatus that I have been talking about consists of Central Office [fol. 7294] equipment and sub-station apparatus, including transmitter, receivers and induction coils, does it not?

A. I am not familiar with their products.

Q. Well, you have examined these apportionments, and you know the telephone apparatus where the shop variations occur consist of Central Office equipment and sub-station apparatus largely?

A. I know it includes——

Q. You know that from the records, do you not?

A. I know it includes telephone appliances.

Q. Exactly. And that the same general class of apparatus is sold alike to Bell and non-Bell customers—telephone apparatus?

A. I have not examined the sales at all.

Q. All right.

A. As to the——

Q. Well, then, you do not express any opinion on that question at all?

A. I express no opinion as to how much—or what classes of sales were made to one customer, or another customer.

Q. I see. You know nothing at all about that?

A. No."

Subject to check, the total sales of the Western Electric manufactures to Bell, $1,660,000,000, and to non-Bell $154,000,000 or total sales of $1,814,000,000, of which only $77,000,000 were special commercial products, leaving a balance of Western Electric manufactures sold during that period to its Bell and non-Bell customers, consisting of telephone apparatus, and lead-covered cable, of $1,737,000,000.

I inquired of the accountants of the Western Electric Company whether they had an accounting system by means of which they could apportion these various shop variations and adjustments to each of the hundred thousand or more than one hundred thousand articles manufactured by the Western Electric Company.

I made that inquiry for the purpose of finding out whether there was any actual cost used in addition to the standard cost.

"Q. You knew before I inquired that the maintenance of such a system would be so absurd and expensive that [fol. 7295] no manufacturing company would consider maintaining it, did you not?

A. I did not take that into consideration at all."

I have had wide experience as an accountant, and have knowledge of the cost of accounting work in places where I have investigated, but not the cost of accounting in places which I have not made any investigation of.

I have gone over these records of the Western Electric Company in great detail.

I could not give an estimate, as an accountant, as to what additional cost in millions of dollars per year would have been incurred by the Western had it maintained the kind of an accounting system, that I asked the Western Electric whether it maintained, without making a survey of the plant, and the present cost methods, and the operations in detail.

I would not venture a guess on it; it would be simply a guess, if I did.

I haven't the slightest idea whether it would be millions of dollars per year because I do not know what it has, what the detail records are. We might be able to use some of the detail records, and we might not.

In referring to the basic gross profit and adjustment figures back in 1924, I did not want to convey the idea that I was denied access to them, because what I meant to say was that repeatedly requests were made for that division between the Bell and the non-Bell, and the matter was delayed from time to time, so far as I was concerned, until I finally got the information that those figures had not been prepared by the Western Electric Company, but the data on which they could be made would perhaps be—or "maybe" was the word used—maybe prepared if they were still in existence at the Hawthorne Plant, or any of the other locations, but I had no assurance whether they were in existence or were not in existence.

Counsel reads part of telegram sent to Mr. Goldstein April 5, 1932 as follows:

"All details to the extent that they are now in existence, which were back of the reports made to the comptroller for the years prior to 1924 in which basic gross profits and adjustments appear, are located at the Hawthorne Works and at our various distributing locations. We will make such [fol. 7296] details available for inspection at places where they are located when you advise us that you desire to proceed."

I saw the telegram.

"Mr. Goldstein: You know there is a telegram there which states that you did not even know if they were in existence.

Mr. Thompson: Certainly, I have no objection to the introduction of other telegrams or letters pertinent to this."

I made no application; I did not go to Hawthorne to find out whether they were in existence.

The reason we did not go out there at that time was that this was toward the end of the investigation, and they were ready to go on trial with it, and we did not have the time to go out, especially in view of the fact that it was doubtful whether those records were in existence or not.

I have no reason to presume that they would have been denied if they could have given us what we asked for if they could have produced them.

I think there is some more information than was read to me.

I have not checked into the profit figures to ascertain the total profits of the Western Electric Company for any of these years or for any group of years.

The figures that I have presented here in the exhibits, the aggregate profit for the entire Western Electric, as well as the sub-classes of telephone apparatus, lead-covered cable and supplies, and the additions between Bell and non-Bell, have been taken from the statements in the binders without verification as to the books, but I have no reason to doubt the correctness of them; neither will I certify to the correctness of them.

The only problem that I have here is the apportionment of allocation of profits as between the Bell and the non-Bell business. I qualify that statement to the extent I was not so much concerned in the aggregate profits of the Bell or non-Bell as I was in the possibility—or the method used in the dividing of the gross profits into the several kinds of apparatus, or appliances, made and sold by the Western Electric Company.

In other words, I was more concerned with the gross profits than anything else.

[fol. 7297] The term basic gross profit is not so used in the subdivisions as shown in our profit and loss account there, because I have taken the understanding that the Western men had, of what should be designated gross profit, what should be manufacturing surplus and current underrun, and what should be inventory revaluation and reserves. I followed absolutely their division of profits to the extent of including under basic gross profit an item of unexplained difference of $1,800,000.

What is termed basic gross profit as used in these exhibits which I have identified is supposed to be the difference between shop cost and sales prices,—the aggregate of standard shop cost and sales price. For 1929 there is a complete analysis, an analysis as made by the Western Electric, showing what is included in the Western gross profit.

That is included in Exhibit X-16.

That explains fully the use of the term "Basic gross profit" as taken bodily from the company's analysis of gross

profit, and has been classified as basic gross profit after cooperation and work with the representative of the Western Electric Company.

All that one needs to do, where it is desired to know the definition of basic gross profit as used in all these exhibits, is to turn to Exhibit X-16.

But it should not be understood that that is the segregation that I would perhaps have made after a lengthy investigation. For expediency sake, we simply got together and worked it out.

From examination of the records of the Western Electric Co. it appears that these shop variations and these adjustments gross and net which I have in my exhibits were ones which were currently made by the Western Electric Company from year to year in its business as it proceeded.

Redirect examination.

By Mr. Goldstein:

I found that the analysis of gross profit seemed to be a little bit more complete, and a little bit more in detail in the later years than in the earlier years.

The $1,800,000, with the unexplained difference that I testified about, was in 1929. The difference between the adjustments that they explained in detail, and the total left an [fol. 7298] unexplained difference of that amount.

When I started to work out at Hawthorne, I asked for, and received and examined the Q2.02-1 reports which showed the sales and standard cost of sales, and which is identified as Defendants' Exhibit D-44.

When I went to New York within the last few weeks, I also examined the similar reports for the other plants.

That analysis in Exhibit D-44 showed the various subdivisions and sub-classes of the main classes that make up the total of their sales, and the cost of sales.

"Mr. Thompson: In connection with Mr. Cummings' testimony, an offer was made by the defendant of Exhibit X-13, among others. The plaintiff objects to the introduction in evidence of Exhibit X-13 which consists of two sheets, one of them purports to be a comparison between Mr. Gregory's statement D, and apparatus prices as used in the Sloan appraisal for central office equipment, station apparatus, and P. B. X. The second page purports to be a comparison

between the Western Electric experience taken from certain costs indices of Mr. Burgess, and the Sloan appraisal.

I think two things are perfectly clear from the testimony of Mr. Cummings. The first is that these are not in fact comparable, neither one of these comparisons attempted to be made. I think his admissions are broad enough to show non-comparability. The second proposition, I think there can be no doubt about, he has never shown comparability, and it seems to me very clear that this exhibit ought not to be permitted to go into evidence.

Judge Wilkerson: What do you think about it?

Mr. Goldstein: I will say this, that it is rather odd that, after they have presented their entire Western Electric presentation on the basis that the Illinois Bell is a fair cross-section, that the prices of the Bell System as a whole, are to be taken into account, and the costs, and it is then a question of taking a percentage, and now, after they have furnished us the evidence, and we make use of it, that they should object to it. Now, we will ask that the Burgess index numbers be offered here, we have asked for that, and it has been produced, and it is with an agreement that it be made available when we want it; and we want it. If we [fol. 7299] use the very basis they have used in the Western Electric presentation, particularly since Mr. Sloan used Western Electric prices, I cannot see any possible reason for objecting to it, unless they object to their own method of proof. Mr. Sloan has used installation costs, the Western Electric installation costs, and he has used,—he says he has used those prices and he has used those installation costs.

Mr. Thompson: Of course the trouble with Mr. Goldstein's argument is, it is predicated upon the proposition he has taken two things that comprehend like articles. In the Gregory trend are receivers, transmitters and induction coils of the years. In the Sloan trend, on the other side, there are no receivers, transmitters or induction coils prior to 1928, because they were not owned by the Illinois Bell. In the Gregory trend there are loading coils, and there are repeater installations, and of course, they are wholly omitted from the three accounts selected for the classification from Sloan.

In Sloan's trend there is all the reissued Class C stock, there is none of it in Gregory's trend. In Gregory's trend there is the A. H. material, remanufactured by the Western,

and there is a qualified admission by Mr. Cummings that it may not all be in the Sloan trend.

So the trouble is, we have a theory, and I think we have proved it to be true, that the Illinois Bell is a fair cross section, but they don't take and make the comparison on that basis. They select out three accounts that are wholly non-comparable with Sloan's trend."

(Objection; overruled.)

"Mr. Thompson: Your Honor, we offer in connection with Mr. Cummings' testimony the exhibits which were identified on cross-examination, which are numbers 212, 213, 214 and 215. Do you want to know what they are, Mr. Goldstein?

Mr. Goldstein: Yes.

Mr. Thompson: 212 is the Representative Weighted Plant of the Indiana Bell Telephone Company. 213 is the specific estimates that was discussed during Mr. Sloan's testimony, number 22150. 214 is a duplicate of Exhibit 50 introduced by Mr. Sloan on the first trial of this case. And 215 is the work sheet of Mr. Cummings, which he used in connection with the material costs of exchange pole lines.

[fol. 7300] Mr. Goldstein: To the first one, I certainly object, because the witness has testified he had not prepared it, and he did not offer it, and he did not testify about it, and he doesn't know anything about it. That was in the Indiana Bell Telephone case, it was an Indiana Bell Telephone case Exhibit, it wasn't his. It has nothing to do with the case.

(Plaintiff's Exhibits A-212, A-213, A-214 and A-215, and Defendants' Exhibits Nos. X-15, X-15A, X-15B, and X-16 to X-47A, inclusive, identified by Mr. Hagberg, offered and received in evidence.)

(Objection to Plaintiff's Exhibit A-212; overruled.)

George B. McCann, a witness on behalf of the defendants, having been first duly sworn, testified as follows:

Direct examination.

By Mr. Goldstein:

June 7, 1932.

My name is George B. McCann. I reside at Bloomfield, New Jersey. I am employed by Touche, Niven & Company,

public accountants, New York City, as a supervising senior accountant. I have been associated with that company for the past six and a half years. Prior to that I was associated with Klein, Hinds & Finke, certified public accountants, also of New York, for a period of four years. Before entering the public accounting field, I was employed in private accounting work by various commercial concerns. I am a graduate of New York University. I am a certified public accountant of the State of New York. My duties consist principally of the conduct of audits and investigations of large mercantile and manufacturing organizations. I am employed by the City of Chicago in connection with the presentation of the portion of its case relating particularly to the Western Electric exhibits.

The exhibits which are to be offered, beginning with X-48, were prepared by me or under my supervision, in so far as they contain computations.

X-48 is entitled "Average investment, net profits and percentage of return (Per Exhibits A-77 and A-79)—Bell and non-Bell business for the years 1916 to 1930." Exhibit X-48 shows the return on the investment in Bell and non-[fol. 7301] Bell business combined, using the figures appearing in Plaintiff's Exhibits A-77 and A-79.

I have made no change in those figures. I have just added the corresponding figures together. Exhibit X-49 consists of three pages. Page 1 is entitled "Western Electric Company, Inc. Average investment per Exhibits A-77 and A-79 adjusted to exclude excessive cash, current liabilities, reserve for Pension Fund and reserve for depreciation—Bell and non-Bell business"; page 2 is entitled "Average investment per Exhibit A-77 adjusted to exclude excessive cash, current liabilities, reserve for Pension Fund, and reserve for depreciation—Bell Business"; and page 3 is entitled "Average investment per Exhibit A-79 adjusted to exclude excessive cash, current liabilities, reserve for Pension Fund and reserve for depreciation—non-Bell business." These were prepared under my supervision.

Page 1 relates to the Bell and non-Bell business combined. Page 2 relates to the Bell business only, and page 3 relates to the non-Bell business.

The column headed "Average Investment" is similar to the column shown in Exhibit X-48, that is a combination of the investment appearing in Plaintiff's Exhibits A-77 and

A-79. The column "Excessive Cash" represents the amount by which the average cash balances used in the compilation of Exhibits A-77 and A-79 exceeded the normal cash working balances for the Western Electric Company as shown by the report CR-714 of that company, which I examined.

The column "Notes payable—Others" represents the average indebtedness to banks and others on notes payable. These liabilities are listed in the annual reports of the Western Electric Company as current liabilities and they correspond to the class of liabilities which are included under current liabilities in Poor's and Moody's and in the annual reports of the industrial companies, including the eighty-eight companies shown in Plaintiff's Exhibit A-85.

Exhibit X-49½ is a sheet taken from Poor's 1930 Manual, entitled "Public utilities (Western Electric Co., Inc.)" That sheet, at the bottom, under "Statement of working capital, December 31," under "Current Liabilities," includes the class of liabilities which I have included in my "Payables—Others."

[fol. 7302] There were notes payable that I have shown in the third column, "Others," in X-49 which were not excluded from the investments as calculated by Mr. Gregory in Exhibits A-77 and A-79. The column "Notes payable—Trustees of Pension Fund" represents the average indebtedness to the trustees of the Pension Fund under "Notes payable." In the year 1928, these notes were included under "Notes payable—Others"; we make no distinction between these notes and the notes payable that are listed under "Others." They fall in the same category, and, therefore, are excluded from the average investment.

The column "Reserve for Pension Fund" (fifth column, page 1 of Exhibit X-49) represents the amount that is set aside out of profits to take care of future pensions of employes.

The additions to this reserve are charged against profits in each year, and the fund is so built up that it does not participate any further in the profits of the company. The reserve is excluded from the average investment used to determine the percentage of return. That is, it is excluded in our computation, as otherwise the stockholders would be

profiting to the extent that the pension fund was included in the average investment.

Subsequent to 1927, the Pension Fund accruals were built up to participate in additional earnings only to the extent of the interest which is paid to the trustee of the Pension Fund. In those years, where the notes to Trustees are deducted, the interest is likewise excluded from our computation of operating earnings.

That is, I took out from the operating earnings as shown by Mr. Gregory, an additional deduction of interest to the Trustee under the Pension Fund, charged it to the operating earnings, and then I excluded from the rate base the amount of the principal in the obligation to the trustee of the Pension Fund. The column, "Working reserves (part interest and taxes part accounts payable)" represents principally accrued expenses which are properly classified as current liabilities. The distinction between this class of liability and accounts payable is a purely technical one, as there is no real distinction between a recorded account payable and an accrued expense to take care of some in- [fol. 7303] curred liability for which no recorded invoice has been entered. The entire amount of the liability has been charged against earnings. I examined Mr. Gregory's working papers for the years 1916 to 1925. I found that in the years 1916 to 1925, that those working reserves were not shown as such, but were included under the caption "Accounts payable" and were, therefore, deducted, in arriving at the average investment shown in Exhibits A-77 and A-79. That is, he deducted them from the rate base from 1916 to 1925, but not from 1925 to 1932.

The next column "Total adjustments" represents a total of the adjustments which have previously been described, beginning with Excess Cash and ending with Working Reserves. That is just a total of the preceding column of figures.

The column "Average investment before depreciation per Exhibits A-77 and A-79 adjusted," represents the average investment shown in those two exhibits after the deduction of the column "Total adjustments." That is, it just gives effect to the adjustments.

The column "Reserve for depreciation" represents the average reserve for the depreciation of plant, giving effect to the exclusion of extraordinary and excessive depreciation, the details of which are given in a later exhibit, X-50,

entitled "Reconciliation of Net Profits per Exhibits A-77, A-79, and Exhibits A-77 and A-79 combined, with Profits as Adjusted—Bell and Non-Bell business." That is, I will show later that the expenses of the Western Electric as shown by Mr. Gregory were adjusted, and I give effect here to the rate base resulting from that adjustment.

The column headed "Average investment after depreciation" is the average investment per Exhibits A-77 and A-79, after deduction of the column "Total adjustments" and the column "Reserve for depreciation."

The differences between Mr. Gregory's method used in deducting depreciation reserve in A-194 and in X-49-A, entitled "Earnings of Western Electric Company on Non-Bell business expressed in percentages of Sales and in percentage of (a) Average Investment, and (b) Average Investment less amount of Depreciation Reserve Account 1916-1932, Inclusive," and the method used in Exhibit X-49 are, first, Mr. Gregory deducted the depreciation reserve [fol. 7304] shown by the books, which included the extraordinary depreciation set up in the years 1924, 1925, 1926, 1927 and 1928.

Exhibit X-49 has a smaller depreciation reserve because of the exclusion of this so-called extraordinary depreciation.

The second difference is that in compiling his average reserve for depreciation, Mr. Gregory used the opening and closing figures for each year, that is, December 31st figures, divided by two.

In Exhibit X-49, in the earlier years, the opening and closing figures were used because there were no other figures available; but in the later years, where monthly averages were available, we used the monthly figures to arrive at a more accurate figure.

I do not believe that the variance between the two figures, that is, Mr. Gregory's, and those shown in X-49, would be very significant.

The third difference is a method of allocation between Bell and non-Bell. Mr. Gregory used a detail method, involving a knowledge of the amount of depreciation reserve which was allocable to a particular class of plant used in Bell and non-Bell business.

At the time that we made our examination of the records, we did not find, nor was any data made available to us, whereby we could distribute the depreciation reserve as

between various classes of equipment, or as between Bell and non-Bell.

For that reason, we distributed the depreciation reserve on the basis of allocation of plant which has been used by Mr. Gregory in preparing the investment figures building up Exhibits A-77 and A-79.

Exhibits A-194 and X-49-A, were delivered to me after my computations were all made up that entered into X-49, and the explanations were given by the Western Electric as to the method in A-194 and X-49-A, at or about the time when they delivered those documents. I don't think the difference caused by the allocation method used by Mr. Gregory relating to this factor allocating the plant would materially affect the result. I think the only real difference between Mr. Gregory's figures and the figures in Exhibit X-49 would result from the exclusion of the extraordinary depreciation reserve.

Page 2 of Exhibit X-49 is similar to page 1, except that [fol. 7305] it relates to Bell business only, as shown in Exhibit A-77. That is, page 2 allocates to the Bell business the portion of the adjustments, the total of which is contained on page 17.

Page 3 allocates to the non-Bell business the portion of the adjustments, the combination of which, Bell and non-Bell, is shown on page 17, and shows on pages 2 and 3 the effect of the rate base in each case for Bell business and non-Bell business.

The allocation between Bell and non-Bell on pages 2 and 3 of X-49, we made in this manner: The cash and payables were apportioned between Bell and non-Bell on the same basis as the cash and payables were apportioned by Mr. Gregory in arriving at the investments shown in Plaintiff's Exhibits A-77 and A-79.

When I said that the cash and payables were apportioned, I meant the excess cash.

The reserve for depreciation was apportioned on the basis of the plant which was allocated to Bell and non-Bell by Mr. Gregory in connection with Exhibits A-77 and A-79. For this purpose I adopted his apportionment of the assets, as a basis for apportioning the reserve.

Exhibit X-50, entitled "Reconciliation of net profits per Exhibits A-77 and A-79 with profits as adjusted—Bell and non-Bell business," on page 1, and page 2, "Net profits per Exhibit A-77 as adjusted—Bell business," page 3, "Re-

conciliation of net profits per Exhibit A-79—non-Bell business with profits as adjusted," shows a reconciliation. This exhibit of three pages was compiled by me, under my supervision.

Page 1 applies to the Bell and non-Bell companies combined.

Page 2 applies to the Bell business only, and page 3 to the non-Bell business.

On page 1, column 1, "Net profits per Exhibits A-77 and A-79" corresponds to the similar column in X-48. The next column, headed "Pension Fund Accruals" represents the adjustment of profits by reason of substituting for the pension appropriations charged on the books of the company, the pension requirements as shown by an actuarial computation furnished us by the Western Electric [fol. 7306] Company, and now identified as Exhibit D-26.

Mr. Gregory's Exhibits A-77 and A-79 included in the years 1925 to 1929, charged as operating expenses, not only the current requirements for the pension fund as shown by the actuarial study, but also amounts to make up deficiencies of prior years.

In Exhibit X-50, the charges for pension fund have been reapportioned to charge the operations of each year with the amount of pension fund shown to be required by the actuarial studies. In making this adjustment, the full amount of the actuarial requirements for the fifteen-year period was used, which is in excess of the amounts charged on the books, and in excess of the amounts used in the compilation of profits shown in Exhibits A-77 and A-79. The amount which is charged as an operating expense during the fifteen-year period exceeds the amount which Mr. Gregory charged for the same period in Exhibits A-77 and A-79, in the amount of $359,000.

What I did there was to take the figures as I found them in the actuarial computation, and merely distribute them in the years in which they were supposed to have the deficiency. With reference to the similar item in the case of the eighty-eight companies shown in Exhibit A-85, I found that it was customary to charge to surplus similar adjustments which made up deficiencies of prior years.

In an exhibit to be offered later, X-94, such a provision appears as a surplus charge in the Dupont Company, such surplus adjustments aggregating $8,600,000 made in the year 1926 and in the year 1929. No effect is given in my

calculations to the possibility that the pension fund reserve at December 31, 1930, is excessive in the light of the depression, and that excess could have been used to make up deficiencies which I have charged against the operating earnings of the years prior to 1924.

(Counsel for defendants admits witness does not testify as an actuary. Motion of plaintiff to strike out the statement of the witness just made, on the ground that he has not qualified as an actuary, and therefore cannot express any opinion about it.

Court rules that it may stand as a matter of accounting only.)

[fol. 7307] The next column headed "Extraordinary Depreciation" represents the depreciation taken by the company in the years 1924, 1925, 1926, 1927 and 1928, as a reserve against probable shrinkage in reproduction value of the plant, predicated on the estimated price level for the ten-year period 1931 to 1940.

In my examination of Exhibits A-77 and A-79, and the working papers underlying Exhibits A-77 and A-79, I did not find any figure, or any calculation, or any fact therein which showed that there was any shrinkage in book value used by Mr. Gregory as a rate-base below the book cost during the period subsequent to 1924, 1925 and 1926.

(Defendants' Exhibit D-27 furnished to defendant by plaintiff offered and received in evidence.)

In my examination of A-77 and my examination of A-79, or in the examination of any of the records, or in the examination of the working papers underlying A-77 or A-79 I did not find in A-79 any computation, or any figure which showed that Mr. Gregory used as his rate base a figure for the plant or the equipment, any figure below book cost, in computing his rate of return. Among the eighty-eight companies which are shown in A-85, Mr. Gregory's exhibit, I found that charges similar to this reserve were made as adjustments against surplus rather than against current operation. That will be shown in Exhibit X-94 later.

I did not distribute the two million dollar deduction, for the period over the years 1924 to 1927. I did not distribute it for the reason that in the years 1924 to 1927 the company used a rate of seven and one-half per cent as depreciation on its machinery, in conformity with the general practice

of manufacturing companies, as shown in the case of the eighty-eight companies, as will be shown on an exhibit to be offered later, X-93.

"Q. As a basis of comparison with those companies, will you state whether the Western Electric made a claim to the Internal Revenue Department for deduction of this two million dollars, as an operating expense, either in the year '27, or in the year '28?"

(Objection by plaintiff on the ground that the question of what claim may or may not have been made by the West- [fol. 7308] ern Electric to the Department of Internal Revenue in connection with depreciation can have no bearing upon the actual facts of depreciation existing in the plant. Counsel for defendants stated that the question was limited to the sole purpose of comparing this company's practice with those of the eighty-eight companies, which show that they do follow the rules of the Internal Revenue Department. Objection overruled.)

The company did not make such a claim. The next column "Excessive Depreciation" represents the adjustment resulting from spreading the charges for small tools, and furniture and fixtures over a four and six-year life, instead of charging off the entire purchase in the years in which made, as is the practice of the Western Electric Company. The adjustment which has been made in Exhibit X-50 conforms to the amounts of depreciation allowed by the Internal Revenue Department.

(Counsel for defendants states that the above statement will stand for the sole purpose of the comparison, and nothing else.)

The column "Federal Income Taxes" represents the adjustments to profits by reason of allocating the Federal Taxes paid to the years to which they apply, rather than to the years to which the charges were made.

The next column "Total Adjustment" represents the total of adjustments as they have been previously described. The next column "Profits as adjusted before interest deductions" represents profits per Exhibits A-77 and A-79 adjusted by the amount appearing in the column "Total adjustments."

The next column, "Interest to current obligations" represents the amount of interest paid which is applicable to

current liabilities. This was deducted from profits, for the reason that the current liabilities were deducted in arriving at the average investment. By so doing, I reduced the profit shown by Mr. Gregory to the extent of this interest.

The next column "Interest on excessive cash balances" represents an adjustment to exclude from profits the estimated amount earned on the excessive cash balances which were excluded from the average investment in Exhibit X-49. To that extent, I reduced net profits available for return, as shown by Mr. Gregory.

[fol. 7309] The next column, "Profits as adjusted," represents the final adjusted profits after deduction of interest on current obligations and excessive cash balances. Page 2 is similar to page 1, except that it applies to A-77, Bell business. The same explanations apply to the deductions on this sheet as to page 1.

Page 3 is similar to X-50, page 1, except it applies to Exhibit A-79, non-Bell business. The explanations given for page 1 are equally applicable to page 3. In allocating the adjustments between Bell and non-Bell business, I followed as closely as possible the basis of allocation used by the company in preparing Exhibits A-77 and A-79, so as to give effect to the factors of adjustment alone, without taking into account the propriety of the method of allocation used. That is, I am just making the allocation to give effect to the particular adjustments shown in X-50. Exhibit X-51, page 1, is entitled "Return on average investment per Exhibits A-77 and A-79 adjusted to exclude excessive cash, current liabilities and reserve for pension fund—Bell and non-Bell business." Page 2 covers the same thing, entitled "Return on Average Investment per Exhibit A-77 Adjusted (before Depreciation) Bell Business (Dollars in Thousands)," only limited to Bell business; and page 3, entitled "Average Investment, Net Profits and Percentage of Return on Investment—non-Bell Business," limited to the non-Bell business. Exhibit X-51 makes the adjustment in the investment only and not in the net profits.

Page 1 shows for the Bell and non-Bell business combined, the rate of return on the average investment as adjusted before depreciation. Page 2 is the same thing for the Bell business and page 3 for the non-Bell business. The column entitled "Average investment adjusted before depreciation" conforms to the third to last column headed similarly shown in Exhibit X-49.

The column "Net profits" in X-51 conforms to the figures given in A-77 and A-79, and the combination of the two shown in X-48. The last column, headed, "Per cent return on average investment," page 1, shows combined Bell and non-Bell, page 2, Bell, and page 3, non-Bell.

Exhibit X-52, consisting of three pages, entitled "Return on Average Investment per Exhibits A-77, A-79, and Ex- [fol. 7310] hibits A-77 and A-79 combined, as Adjusted (after Deducting Depreciation) Bell and non-Bell Business," is identical to X-51, with the single exception that it makes a further adjustment by the deduction of depreciation reserve. For the purpose of X-52 I again only show adjustments on the rate base, but not in the adjustments in the net profits, as shown in Exhibits A-77 and A-79, and pages 1, 2 and 3 which represent the result of the combined business, and the non-Bell business and the Bell business, respectively.

Exhibit X-53 consists of three pages, entitled "Average Investment per Exhibits A-77, A-79, and Exhibits A-77 and A-79 combined, Profits as Adjusted and Percentage of Return—Bell and non-Bell Business," and in column 2 on each of the sheets it is intended to reflect the effect of the adjustment to profits shown in X-50, but not to show any effect on the adjustments of assets.

Page 1 shows the return on investment in Bell and non-Bell business combined, and page 2, the return on investment in Bell business, and page 3 the return on investment in non-Bell business. The column "Average investment" is in conformity with the figures given in Plaintiff's Exhibits A-77 and A-79 for the Bell business and the non-Bell business separately and combined in X-48, as there shown.

In X-53 I adopt the average investment compiled by Mr. Gregory so as to reflect the effect only of adjustment to profit shown in X-50. The column "Profits as adjusted" corresponds to the column headed "Profits as adjusted before interest deductions" shown in Exhibit X-50. The last column, then, shows "Percentage of return on Investment," giving effect to the adjustments of profits only.

Exhibit X-54, entitled "Average Investment per Exhibits A-77, A-79, and Exhibits A-77 and A-79 combined, Adjusted (before Depreciation), Profits as Adjusted and Percentage of Return—Bell and non-Bell Business," consisting of three pages, shows the effect of the two adjustments, one, in the investment, as shown in X-49, and two, the adjustment in

profits as shown on X-50, only using the rate base before depreciation deduction.

Page 1 shows the return on investment in Bell business and non-Bell business combined; page 2, the return on in-
[fol. 7311] vestment, Bell business; and page 3, the return on investment in non-Bell business.

The column "Average investment adjusted before depreciation" conforms to the column similarly headed in Exhibit X-49, and the column "Profits adjusted" corresponds to the similar column shown on Exhibit X-50, and the final column shows the percentage of return, on the basis of the two classes of adjustments, one to profit, and one to the rate base before depreciation.

Exhibit X-55, entitled "Average Investment per Exhibits A-77, A-79, and Exhibits A-77 and A-79 combined, Adjusted (after Depreciation), Profits as Adjusted and Percentage of Return—Bell and non-Bell business," is identical with X-54, excepting that it gives effect to the deduction of the depreciation reserve from the adjusted rate base. It shows, from the Bell business, the return on investment from 1923 to 1930 to be as follows:

1923, 4.4 per cent; 1924, 10.3 per cent; 1925, 17 per cent; 1926, 15.6 per cent; 1927, 19.6 per cent; 1928, 20.3 per cent; 1929, 17.2 per cent; 1930, 6.2 per cent.

For the non-Bell business for corresponding years, it shows for 1923, 25.1 per cent; 1924, 18.6 per cent; 1925, 5.8 per cent; 1926, 28.3 per cent; 1927, 22.1 per cent; 1928, 32.7 per cent; 1929, 44.3 per cent; 1930, 10.4 per cent.

For the combined Bell and non-Bell business for the same years, it shows for 1923, 6.3 per cent; 1924, 11.1 per cent; 1925, 15.7 per cent; 1926, 16.4 per cent; 1927, 19.7 per cent; 1928, 21.3 per cent; 1929, 20.4 per cent; 1930, 6.5 per cent.

Exhibit X-56, entitled "Average Investment per Exhibits A-77, A-79, and Exhibits A-77 and A-79 combined, Net Profit (Adjusted in Respect of Pension Accruals) and Percentage of Return—Bell and non-Bell business," consists of three pages and shows the effect on the combined Bell and non-Bell return, and on the Bell and non-Bell return separately of the one adjustment to net profits for pension fund accruals.

Page 1 shows the return on investment of Bell and non-Bell business combined with that adjustment; page 2, the return on average Bell business; page 3, the return on the

average investment in the non-Bell business, on the basis of that one adjustment to Mr. Gregory's figures.

Exhibit X-57, entitled "Average Investment per Exhibits A-77, A-79, and Exhibits A-77 and A-79 combined, Adjusted [fol. 7312] (before Depreciation), Profits (Adjusted in Respect of Pension Accruals), and Percentage of Return—Bell and non-Bell Business," is identical with X-56, excepting that it shows the effect of the adjustment for pension fund accruals applied to the adjusted rate base, per X-49, before depreciation.

Exhibit X-58, entitled "Average Investment per Exhibits A-77, A-79, and Exhibits A-77 and A-79 combined, Adjusted (after Depreciation), Profits (Adjusted in Respect of Pension Accruals) and Percentage of Return—Bell and non-Bell business," is identical with X-57, excepting only that it contains the additional depreciation reserve deduction. In other words, in X-58, I show the effect of making the one adjustment of pension fund accruals on the basis of the adjusted rate base, as I have heretofore computed it, after deducting the depreciation reserve, page 1, for the combined business, and then, pages 2 and 3, for the Bell and non-Bell business separately.

Exhibit X-59, consisting of three pages, entitled "Average Investment per Exhibits A-77, A-79, and Exhibits A-77 and A-79 combined, Profits (Adjusted in Respect of Extraordinary and Excessive Depreciation) and Percentage of Return—Bell and non-Bell Business," shows the effect on the combined Bell and non-Bell investment, and on the Bell and non-Bell investment separately, of the adjustment to profits for extraordinary and excessive depreciation, as shown in X-50.

Exhibit X-60, consisting of three pages, entitled "Average Investment per Exhibits A-77, A-79, and Exhibits A-77 and A-79 combined, Adjusted (before Depreciation), Profits (Adjusted in Respect of Extraordinary and Excessive Depreciation) and Percentage of Return—Bell and non-Bell Business," is identical with X-59, excepting only that it gives effect to the adjusted average investment before depreciation, as shown in Exhibit X-49.

Exhibit X-61, entitled "Average Investment per Exhibits A-77, A -79, and Exhibits A-77 and A-79 combined, Adjusted (after Depreciation), Profits (Adjusted in Respect of Extraordinary and Excessive Depreciation) and Percentage

of Return—Bell and non-Bell business," is identical with X-60, excepting that it gives effect to the adjusted average investment after deducting the depreciation in Exhibit X-49.

Exhibit X-62, entitled "Average Investment per Exhibits A-77, A-79, and Exhibits A-77 and A-79 combined, Profits [fol. 7313] (Adjusted in Respect of Federal Income Taxes) and Percentage of Return—Bell and non-Bell Business," shows the effect on the combined Bell and non-Bell investment, and also on the separate Bell and non-Bell investment, of the adjustments to profits for Federal income taxes, as shown in X-50.

Exhibit X-63, entitled "Average Investment per Exhibits A-77, A-79, and Exhibits A-77 and A-79 combined, Adjusted (before Depreciation), Profits (Adjusted in Respect of Federal Income Taxes) and Percentage of Return—Bell and non-Bell business," is identical with X-62, except it gives effect to the adjusted average investment before depreciation as shown in Exhibit X-49.

In Exhibit X-64, entitled "Average Investment per Exhibits A-77, A-79, and Exhibits A-77 and A-79 combined, Adjusted (after Depreciation), Profits (Adjusted in Respect of Federal Income Taxes) and Percentage of Return —Bell and non-Bell business," I have the identical computations as in X-63, excepting that it gives effect to the adjusted average investment after depreciation, as shown by Exhibit X-49.

Exhibit X-65, entitled "Western Electric Company, Inc.—Return on Average Investment Per Exhibits A-77 and A-79, and Exhibits A-77 and A-79 combined, After Deducting Reserve for Depreciation—Bell and non-Bell Business," is identical with X-48, excepting that it gives effect to the single factor of the deduction of depreciation reserve, without giving effect to any other adjustments. It gives no effect to any profit adjustment, but merely to the deduction of the depreciation reserve from the investment, as shown by A-77 and A-79.

Exhibit X-66, entitled "Reconciliation of Net Profits per Books with Taxable Income Shown in Federal Income Tax Returns, for the Years 1916 to 1930," was reproduced from the company records, and is a reconciliation of the profits shown by the books with the profits as reported for Federal income tax purposes.

Exhibit X-67, entitled "Western Electric—Return on In-

vestment in International Western Electric Company, years 1918 to 1925" was prepared by me and under my supervision. Exhibit X-67 shows that from the organization of the International Western Electric Company to the date of the sale of that company to the International Telephone & Telegraph Company, that the Western Electric earned an average on its investment of 37.2 per cent per year. That in-
[fol. 7314] cludes the profit on the sale to the International Telephone & Telegraph Company. I included all of that profit, and allocated it to the period, 1918 to 1925.

I allocated it to the period 1918 to 1925 for the reason that the annual reports of the Western Electric Company for the years prior to 1920, show that the foreign business of the Western Electric practically ceased during the War, and that the business was operated in the years immediately preceding 1918 at a loss, and that there were large losses in the investment itself, due to wartime conditions.

This exhibit does not take into account the question as to whether any portion of the purchase price was given as consideration for any sales contract.

June 8, 1932.

Exhibits X-48 to X-66 concern the profits of the Western Electric Company on its sales to the Electrical Research Products, to Graybar, to the Northern Electric, and to the International Western Electric Company where sales were made to them, and they do not include any profits of the Electrical Research Products, or Graybar, or the Northern Electric, or the International Western Electric Company, to their customers.

(Defendants' Exhibit X-68, entitled "Agreement between the Western Electric Company, Inc., and the International Telephone & Telegraph Corporation, and the International Western Electric Company, Inc., dated August 14, 1925," and Exhibit X-68-A, entitled "Agreement between Western Electric Company, and International Western Electric Company, dated October 1, 1925," offered and received in evidence.)

Defendants' Exhibit X-69, entitled "Western Electric—Investment in International Western Electric, Years 1918-1925," is taken from the books of the company, and shows the ratio of earnings of the International Western Electric Company to the Western Electric Company investment in

the business. The per cent return for the period 1918 to 1925 is 18.6 per cent.

The difference between this exhibit and Exhibit X-67 is that X-69 includes all of the earnings of the International Western Electric, whereas X-67 includes only that portion of the earnings declared as dividends to the parent company, plus the profit made by the parent company on the sale [fol. 7315] of the International Western Electric Company to the International Telephone & Telegraph Company.

Exhibit X-70, entitled "Western Electric—Investment in International Western Electric Company, Inc., giving effect to accumulated earnings, years 1918-1925," shows the return on investment of the Western Electric Company in the International Western Electric Company, giving effect to the earnings not declared as dividends. It shows that for the period 1918 to 1925, the return on the average capital stock and surplus combined was 13.2 per cent. This exhibit does not include the profit on the sale to the International Telephone & Telegraph Company.

Exhibit X-71, entitled "Western Electric Supply Department, 1916 to 1925," was taken from reports and data furnished to us by the Western Electric Company. It shows the return on the Supply Department, treated as a separate department. The investment shown in the first column is built up according to reports on the same basis as the average investment as shown in Plaintiff's Exhibits A-77 and A-79. That is before deducting depreciation reserve and after deducting that portion of current liabilities that was used in determining the average investment as shown in A-77 and A-79.

Exhibit X-72, entitled "Western Electric—Return on Investment in Graybar Electric Company, Inc., Years 1926 to 1928, Inclusive," was taken from the company's records and represents the return on investment, computed on two bases. The first computation shows the return on investment based on the original investment as carried on the books of the Western Electric Company, and shows a return of 27.53 per cent for the three-year period 1926 to 1928, inclusive.

The second computation shows that giving effect to the surplus earnings of the Graybar Electric Company, the return is an average of 23.58 per cent for the same three-year period.

Exhibit X-73, entitled "Graybar Electric Company, Com-

parative Statement of Sales and Profits on Western Electric Manufactures and on Other Products," is a comparative statement of sales and profits on Western Electric manufactures and on other products. The sales and profits on Western Electric manufactures are taken from Exhibit D-49. [fol. 7316] The sales and profits on other products represent the difference between the sales and profits shown on Exhibit D-49, and the total sales and profits as shown by annual reports of the Graybar Electric Company.

This exhibit shows that the sales of Western Electric manufactured articles constituted approximately 15 per cent of the sales for the years 1926, 1927 and 1928 combined; and that the profits derived from Western Electric manufactures contributed approximately 60 per cent of the net profits for the same period.

Taking the two years 1926 and 1927, combined, the sales of the Western Electric manufactures constituted approximately 16 per cent of the total, while the net profits derived from Western Electric sales constituted 75 per cent of the total profits for the two years, 1926 and 1927. For the year 1926, the sales of Western Electric manufactures constituted approximately 16 per cent of sales, while the Western Electric manufactures contributed 98 per cent of the net profits.

Exhibit X-74 is a copy of the stock certificate of the Graybar Electric Company, and was furnished by the plaintiff. There were 60,000 shares of stock of the character described in Exhibit X-74 received by the Western Electric Company at the time of its sales to the Graybar Management Corporation.

(Defendants' Exhibit X-74-A, entitled "Agreement between Electric Research Products, Inc., and the Graybar Management Corporation and Graybar Electric Company, Inc., dated November 5, 1928," covering changes in capital structure and sale of common stock, offered and received in evidence.)

On the back of this stock certificate identified as Exhibit X-74, appears an agreement by which the Western Electric Company is entitled to participate in the earnings of the Graybar Electric Company, beginning with 1929, in the proportion of 1 per cent of the net earnings as defined in the agreement for each 1,000 shares of stock held by the Western Electric Company.

In other words, in 1929, the Western Electric Company would get in addition to its 7 per cent preferred stock dividend, 60 per cent of the net earnings of the Graybar Company, over and above that, provided there were no retirements during the year.

[fol. 7317] Exhibit X-75, entitled "Graybar Electric Company, Inc.—Additional Dividends on Preferred Stock received by Subsidiaries of the Western Electric Company for the years 1929 through 1931," shows that in the year 1929, the Western Electric Company received from the earnings of the Graybar Company, $1,105,000; in the year 1930, $318,895. And subject to correction, in the year 1931, $11,367, a total for the three-year period of $1,412,528. These earnings are in addition to these $7 per share on the preferred stock.

Exhibit X-75-A, entitled "Western Electric—Sales to Graybar Electric Company," was furnished by the Western Electric Company through Mr. Bracelen to us, and shows sales by the Western Electric to the Graybar Company during the years 1929, 1930 and 1931.

"Mr. Goldstein: At this point I would like to read into the record the correspondence that has transpired between Mr. Bracelen and myself with reference to the sales of the Graybar Company, the refusal to divulge certain information.

Mr. Thompson: Just what is the purpose of this?

Mr. Goldstein: The purpose of this is to show that the Western Electric Company has refused to furnish us a statement showing the sales of Western Electric manufactures by the Graybar Company, 1929, 1930 and 1931. We want the record to show the refusal——

Mr. Thompson: Of course——

Mr. Goldstein: —by Mr. Bracelen.

Mr. Thompson: —the Western Electric Company does not own Graybar.

Mr. Goldstein: No, but under this agreement——

Mr. Thompson: And he is just——

Mr. Goldstein (Continuing): —but under this agreement, the Graybar Company employees have the option to turn back the stock and get their money back, even in case of bankruptcy, and the Western Electric Company has the right to take back the stock; and it is just, in our opinion, a sham.

Judge Wilkerson: What is the evidence? You say you called upon some one, you called upon Mr. Bracelen to furnish——

Mr. Goldstein: Yes, and I just wanted to show that we [fol. 7318] called on Mr. Bracelen—on the plaintiff, to make available for inspection the total sales of the Graybar Company, grouped by the following classes: Sales by the Western Electric to Graybar in 1929, 1930 and 1931, divided into special commercial products; Western Electric manufactures, telephone appliances, lead-covered cable and supplies; and also to make available for inspection the profit and loss statement of Graybar, and the statement showing how the additional dividend shown in Exhibit X-75, the refund, was arrived at in each year; to which we have a reply from Mr. Bracelen:

'In view of the fact that the Western Electric Company has not owned the Graybar Electric Company during the period inquired about, I decline to furnish the information requested under sub-division D and E'—those being our requests,

'—in your letter; except that you have already been supplied with full information as to how the additional dividend from the Graybar Electric Company to the Western Electric Company was arrived at during this period.'

I want to introduce that letter in evidence.

Judge Wilkerson: You may put in the correspondence, but I think the observation should be made that the process of this court is open to you, if you want any evidence produced, under subpoena.

Mr. Goldstein: Yes.

Mr. Thompson: Well, now——

Judge Wilkerson: I do not know that we will get very far in this, by putting in correspondence of that kind.

Mr. Goldstein: All right.

Judge Wilkerson (continuing): Because if you are going to make any point on the decision of the court here about it, it is your duty to subpoena your witness.

Mr. Goldstein: No, we are just going to make the point that they have not made a full disclosure.

Judge Wilkerson: But that does not make any progress with the court.

Mr. Goldstein: All right.

Judge Wilkerson: If you want any evidence produced, you may apply to the court for a subpoena, and the court will give you a subpoena, and will bring the witness in here, [fol. 7319] and if it is material, we will get the evidence in the record.

Mr. Goldstein: All right.

Judge Wilkerson: And we will not have this case go off on some correspondence between lawyers about making certain documents available for inspection. Now, this case is not going off on that.

Mr. Goldstein: Well, then, we will ask——

Judge Wilkerson: Well, make your application——

Mr. Goldstein: —that they produce it.

Judge Wilkerson: —in the proper way.

Mr. Goldstein: All right.

Judge Wilkerson: And you will get your subpœna.

Mr. Goldstein: All right.

Mr. Thompson: Your Honor, I do not want to interrupt, except to say that Mr. Goldstein has read one paragraph of this letter. He failed to read a paragraph in which he said that we would furnish to him——

Mr. Goldstein: And you did furnish it.

Mr. Thompson: Yes, and we did furnish to him——

Mr. Goldstein: Yes.

Mr. Thompson: Note!—'The sales of Western Electric to Graybar in 1929, 1930 and 1931 divided into the following classifications: Telephone apparatus including special commercial products, lead-covered cable and supplies.'

And I would like to explain—if these letters are to go in, I want to explain that Graybar does not keep its sales in the classifications that Mr. Goldstein has asked for, and he has also asked us to furnish a profit and loss statement for three years of the company which we do not own or control.

Mr. Goldstein: But which you——

Judge Wilkerson: The point I am making is this——

Mr. Goldstein: Pardon me.

Judge Wilkerson (continuing): —that when this record is closed, the trial has lasted too long, and there has been too much time taken up here, to have this case go off on a question of the refusal to make available certain things for inspection. That is not the way to get at it.

Now, I am giving you timely notice of that fact.

Mr. Goldstein: All right.

Mr. Thompson: And I make the suggestion——

Judge Wilkerson (continuing): And if you expect to in-
[fol. 7320] vite the decision of the court on any matter of that kind, I say if you expect to ask for a dismissal of this bill on any such ground as that——

Mr. Goldstein: No——

Judge Wilkerson: ——you will have to go at it in a different way.

Mr. Goldstein: Certainly.

Mr. Thompson: I say that the statement made on the record is not a fair statement of the facts as they really exist.

Judge Wilkerson: Well——

Mr. Goldstein: We will put in the correspondence, which will show the facts.

Judge Wilkerson: I do not know what use the defendants intend to make of it, but if it is intended—if this use is intended to be made of it, namely, that the court will not proceed to a decree here because of the refusal of counsel for complainant to furnish or make available for inspection certain documents, I am inclined to think that the view of the court will be that timely notice having been given to counsel to fortify their record in an appropriate way, namely, by subpœna addressed to the witness, and during the attendance of the witness in open court, an offer to prove under the Equity Rule, in accordance with the Equity Rule; and the ruling of the court then, after those matters are before the court, will be made. But you cannot just simply have correspondence in here, and then when we get to the end of the record, say, 'Oh, well, you cannot decide this case because they did not make certain things available to us for inspection,' or if the decree might be for the plaintiff, say, 'It might be reversed because they did not make certain things available to us for inspection.'

Now, I am giving you timely notice of the Equity Rule in this respect, and of the correct procedure.

Mr. Goldstein: We understood——

Mr. Haight: May I suggest, however, that the suggestion of the court of course will not bar the defendants from taking the position that the things that we may have asked for, that point out the existence of materials helpful in making a determination here, may be called to the attention of the

court as constituting deficiencies in the plaintiff's case; [fol. 7321] certainly, that is always open to us in any case where we ask for things and do not get them.

Judge Wilkerson: Oh, if they have omitted to prove something——

Mr. Goldstein: Yes.

Judge Wilkerson: —that is essential in this case——

Mr. Goldstein: That is our position.

Judge Wilkerson: —of course, they have failed, that is all.

Mr. Thompson: We do not need any letters, to make that point.

Judge Wilkerson: I think we understand each other.

Mr. Bracelen: I wish to make on observation on the record. We do not attach much importance to the accusations by Mr. Goldstein that things are sham. He said a moment ago that his position is that this arrangement by which the Graybar was sold, is sham. If he thinks he can show anything of that kind to the court, let him proceed. His gratuitous accusation of that kind does not go very far.

Mr. Goldstein: No, but if you will read——

Mr. Bracelen (continuing): Towards establishing anything.

Mr. Goldstein: But if you will read Mr. Gregory's testimony, and then view that in the light of a million dollars additional profit, where he said they made no profit on the sale, and if you will look at the testimony as to whether or not this was an absolute sale, in view of this agreement which we were only handed the day before yesterday, which discloses that even in the case of bankruptcy the Western Electric has the return of the money, and that all of the employees could get would be their money plus 6 per cent interest, it throws an entirely different light on the relationship between the Western Electric Company and the Graybar.

Judge Wilkerson: Well, now——

Mr. Thompson: That whole statement is so inaccurate——

Judge Wilkerson: —just where does that lead ultimately——

Mr. Thompson: Yes.

Judge Wilkerson: —in a rate case?

Mr. Goldstein: It just leads to this, that when they made a franchise agreement to the Graybar Company on Novem-

[fol. 7322] ber 1, 1928, which was four days before the sale, and as that agreement calls for the franchise to the Graybar Company, to sell the merchandise of the Western Electric Company, as a distributor upon the basis of the prices which were established between the Western Electric Company and the Graybar, under this sort of an arrangement, it is our contention that this special agreement which is contained on the back of the stock certificate is an agreement for stock participation in earnings and profits, because of the franchise for the use of these patented articles, these commercial agreements, not part of the sale, and that when you look at the profits of the Western Electric Company on the sale of its merchandise, you should not stop at the transfer to the Graybar Company, but you should look at the profits of the Graybar Company on those sales as really being the full profits of the Western Electric Company to the extent that it participates.

Now, that is our position. They have set up barriers, and they have said in this court, 'When you look at the profits of the Western Electric Company, you must stop at the International Western Electric line, you must stop at the Graybar line.'

Why? These are separate things, in theory of law. We say irrespective of that legal barrier, in truth you have made a sale to yourselves, and when you consider profit, and when you consider the propriety of these adjustments, and the allocations, you cannot adjust them on the basis of the Western Electric Company as a separate entity. And, therefore, you should do with the Western Electric Company and its subsidiaries just what you are doing with the Illinois Bell and the Bell System; you have got to use it as one unit, consider it as one unit.

Judge Wilkerson: Now, you say you want something produced from the Graybar.

Mr. Goldstein: We want produced from the Graybar——

Judge Wilkerson: Now, let us see. Who owns the Graybar now?

Mr. Thompson: Its employes.

Mr. Goldstein: But let me——

Judge Wilkerson: We are speaking now of the power to produce.

Mr. Goldstein: The Western Electric——

[fol. 7323] Judge Wilkerson: Who has the power now?

I am assuming now that the books of the Graybar are in the custody of Graybar.

Mr. Goldstein: Yes.

Mr. Thompson: Right.

Judge Wilkerson: Who has the——

Mr. Goldstein: And may I say——

Judge Wilkerson: Who has the power to produce the books?

Mr. Goldstein: May I say this: under the agreement between the Electrical Research Products and the Graybar Management Corporation, Electrical Research Products, and through it, the Western Electric can make audits of the Graybar Company, and the profit-sharing which we have shown in X-75, 60 per cent of profit in 1929 and the 55 per cent in 1930, are based upon profit and loss statements, and all that we ask is to see those statements upon which they arrived at those dollars.

That is what we ask for.

Judge Wilkerson: Now, assuming that you want the court to make an order on somebody to produce the books of the Graybar Company, upon whom would the court make the order?

Mr. Goldstein: We would ask for an order to have the Western Electric or its subsidiaries produce the statements upon which they received—which they received, and upon which they have the profit calculations.

Mr. Thompson: Your Honor, may I just make this one observation? When this case went to the United States Supreme Court there was a showing as to the Western Electric profits on its total business, and the court said that that was not a sufficient showing because the inquiry that was to be made was, what profit it had made on its Bell business.

Now, the Graybar Electric Company has never done one dollar of business with the Bell Associated Companies. It is non-Bell.

Now, what Mr. Goldstein stands here and tells your Honor is that notwithstanding the decision of the Supreme Court, he wants to put all of the Bell and non-Bell into the pot.

Mr. Goldstein: No.

Mr. Thompson: Now——

[fol. 7323-a] Mr. Goldstein: That is not it.

Mr. Thompson (continuing): —He cannot claim for a minute that the Graybar Electric Company has ever done

one dollar of business with the Bell Associated Companies during the term of its existence.

Mr. Goldstein: But we do claim——

Mr. Thompson: Now, he claims that they should all be joined together.

Mr. Goldstein: Oh, no, but we do claim that the Graybar Company purchased from the Western Electric the same kind of merchandise that was purchased from the Bell System—by the Bell System, and that the method of proof of the profit of the Western Electric on the Bell business involves an allocation between the Bell and the non-Bell; and second, that the Graybar Company is purchasing the products which are the result of the inventions which this record now discloses under the license contract, the Bell Companies have paid for in full, and we have a right to trace the profits in all directions, from the use of inventions for which the licensee companies have paid in full—the expense.

Now, that is the theory upon which we want those profits. They cannot say, 'We are going to make use of those inventions which the Bell System has paid for, and been charged for all of the expenses of,' and then say, 'You have no right to look at the profits.'

That is our position.

Mr. Thompson: Understand, your Honor, that during the entire time that the Western Electric owned the Graybar, Mr. Goldstein has been furnished with those profit and loss statements. He will not deny that.

Mr. Goldstein: No, but we claim that we are just as much entitled to the profits for the years 1928, 1929, 1930 and 1931, when there was this technical sale, because of the fact that the rest of the——

Mr. Thompson: Oh, you have 1928, Mr. Goldstein.

Mr. Goldstein: 1929, 1930 and 1931.

Mr. Thompson: Yes.

Mr. Goldstein (continuing): Because of the fact that under the agreement of sale——

Judge Wilkerson: Of course, when you say "technical sale" —why do you say "technical"?

Mr. Goldstein: Well, for this reason——

[fol. 7324] Judge Wilkerson: It was either a sale, or it was not a sale.

Mr. Goldstein: For this reason, that when you have a sale——

Judge Wilkerson: I do not know of any such thing as a technical sale.

Mr. Goldstein: Yes, but when——

Mr. Thompson: It was an absolute sale.

Mr. Goldstein: Yes, but——

Mr. Thompson: The Western has no right to take it back.

Mr. Goldstein: We have introduced the agreement——

Judge Wilkerson: You mean, a colorable sale.

Mr. Goldstein: Well, yes, that is much the better word.

Judge Wilkerson: That is to say, you mean there was a pretense of sale, when in fact, there was no sale, is that what you are attempting to convey?

Mr. Goldstein: Yes. May I explain it——

Mr. Thompson: We will be very glad to meet that issue.

Mr. Goldstein: Yes.

Judge Wilkerson: That there was a pretense of sale——

Mr. Goldstein: No, not a pretense of sale, but it was a sale under a peculiar arrangement whereby the——

Judge Wilkerson: I may be a little dense on it——

Mr. Goldstein: All right. Here are the facts.

Judge Wilkerson: —but I do not follow you.

Mr. Goldstein: Here is the picture: In 1928, on November 1st, the Western Electric Company through the Electrical Research Products owns all of the stock of the Graybar Company.

Judge Wilkerson: Let us suspend for just a moment.

Mr. Goldstein: Yes, sir.

Judge Wilkerson: We will resume this discussion after the clerk calls the motions.

Mr. Goldstein: Yes, your Honor.

(Following a short intermission, the proceedings were resumed as follows:)

Judge Wilkerson: You may proceed.

Mr. Thompson: Your Honor, I would like to make a short statement about this Graybar situation; there has been so much said about it that I am——

Judge Wilkerson: You want to say some more?

Mr. Thompson: I want to say some more about it, and [fol. 7325] say something that I think will be helpful, and say something that will be I think accurate and to the point.

The Western Electric Company had a supply department which dealt in goods of its own manufacture sold to non-Bell

customers, and in electrical appliances generally. It desired to segregate that business from the business which it was doing with its Bell customers, so that at the end of 1925 it organized the Graybar Electric Company, and turned over all of the business done by the Supply Department of the Western Electric Company, except something in the foreign field.

That company was operated as a wholly-owned subsidiary of the Western Electric Company for the years 1926, 1927 and 1928. During that period of time it is interesting to note from the exhibit that these gentlemen have put into evidence, the sales of the Western Electric manufactures were a very small portion of the total sales of Graybar, although the profits on those manufactures were relatively larger than the profits made by Graybar on the general supply business in which it was engaged.

For instance, in 1928, which was the last year in which the Company was run as a Western Electric controlled subsidiary, it sold $62,000,000 worth of general electric supplies, and less than $10,000,000 of Western Electric manufactures.

Now, that was the situation when the Graybar Management Corporation was organized. It was organized, your Honor, because the management of the Western Electric Company wanted to dispose of this business, absolutely. It preferred if it could to dispose of it to employees of the Graybar Electric Company, who had been employees of the Bell System before the Graybar was organized. It was an absolute sale; there were certain conditions attached to it, and there ought to be no difficulty in ascertaining what those conditions are, and there has never been the slightest concealment about the conditions.

Mr. Gregory said here when he testified before that there was participation by the Western Electric Company in Graybar's profits.

Now, here is just an instance, and here is what it makes out of it, your Honor, and this is all it makes. First, its profits out of its sales of Western Electric manufactures to [fol. 7326] Graybar; then it has a participating preferred stock. Originally, it owned $6,000,000 of that stock, and now it owns $4,000,000.

This witness has said that it gets 60 per cent of net earnings. That is true, but he failed to define what net earnings

are, and they are defined in the contract. Net earnings are after all taxes, payments for Pension Fund and cumulative dividends upon preferred stock, in the sum of $450,000 a year.

Now, here is just one further fact in connection with that, and then I think Your Honor will have this entire picture. Up to the end of 1933, until the end of 1933, the employees of Graybar had the right to require the Western Electric to take their stock back. After that they had no right to require the Western to take it back, and the Western has no option ever to get it back on its own motion.

Now, that is the exact situation. Now, in view of that situation, what is counsel entitled to? He is entitled to know, as I see it, exactly what he has already gotten, your Honor. He has gotten the sales by the Western to Graybar since the Western Electric ceased to own or control Graybar. He has gotten the exact participation in dollars, and his witnesses testified to it, on account of this preferred stock.

Prior to the sale by Graybar, he has had all of the information.

Now, what more can there be in the picture that he is entitled to?

Mr. Goldstein: If the court please, Mr. Thompson forgot to state two facts. One was that when the Western owned all of the stock of the Graybar, there was a commerical agreement, which we will offer as X-76, dated December 31, 1925, which gave Graybar a very limited franchise to sell the products of the Western Electric Company; that as a part of the same transaction by which the Graybar Management Corporation bought the stock, the Western Electric Company made a new franchise agreement with Graybar which we will offer in evidence as X-77.

Mr. Thompson: Both of which we furnished you.

Mr. Goldstein: At my request.

Mr. Thompson: Yes.

Mr. Goldstein: Within a very—within the last few days, as to 76—which shows a very broad license contract for all of the products, all of these commercial products about [fol. 7327] which this lawsuit has a very, very important issue; the tracing of the profits, the credit to the licensees, from the inventions, from the Development & Research, the expenses of which were charged to licensees; and that is the first thing that Mr. Thompson forgot to state to the court.

The second thing is, that Mr. Thompson stated that the Western Electric never had the right, the option, to purchase back the stocks. If by his statement he means the Western Electric, technically, it is correct; but the agreement X-74-A shows the Products, the Electrical Research Products, in Section 5, as—I read, I quote:

'Products is hereby granted an option, to continue in force as long as any of the preferred stock of Graybar is outstanding, to repurchase from Management'—that is the management corporation—'all of the outstanding stock of Graybar at a price determined in the same manner as provided in Section 4.'

So that if Mr. Thompson is trying to shield himself on the ground that the Western Electric does not have the option, but the Electrical Research Products, which is wholly-owned, I say that is not a protection; and as to the fact, as to whether the Electrical Research Products had the option, it is contained in the agreement, which we will leave with the court.

Now, we want to bring this picture to the court, that when you have an unusual transaction, such as in this case, where the Western claims that they made a sale of $9,000,000 of assets for $9,000,000 without profit, and where it appears that as a part of the same transaction they are given the assets—they give the purchaser of the assets a franchise to purchase its products as a distributor, upon preferential treatment as to the costs which are involved in these allocations of the Western Electric between Bell and non-Bell,—and where as a part of a sale you have the purchaser paying not only that $9,000,000, not only the 7 per cent on the unpaid balance of the purchase price, but giving the seller the right to participate to the extent of 60 per cent of the profits, after the taxes and after the dividends, and 55 per cent——

Mr. Thompson: And after the $450,000.

Mr. Goldstein: And after the $450,000; but in 1925,—or in 1929, giving them an additional profit of $1,000,000, and in 1930 an additional profit of $318,000. It is an unusual trans- [fol. 7328] action, as a part of the sale. They have said that it was not, that the sale did not give them that profit.

The only other reason then for that profit is this franchise, which was given as a part of the sale, about which they have said nothing; and it is that franchise which is in-

volved in this litigation, because it involves the sale of these commercial products.

Judge Wilkerson: All this started, I think, from your offer to read certain correspondence.

Mr. Goldstein: Yes.

Judge Wilkerson: It is in the record.

Mr. Goldstein: Right.

Judge Wilkerson: I have suggested——

Mr. Goldstein: We are satisfied.

Judge Wilkerson: I have suggested to you that where a company is involved, where documents are in the custody of its officers, and that company is before the court, if you want anything produced from the records of that company, then you should get out a subpœna.

Mr. Goldstein: But I have a perfect right—we have a right to have the record show it, as bearing upon their proof, that is all.

Judge Wilkerson: If it is a part of their proof——

Mr. Goldstein: We say it is, and we just want to show the absence of it——

Judge Wilkerson: If it is an essential part of their proof——

Mr. Goldstein: Right.

Judge Wilkerson: And it is something that they are bound to show——

Mr. Goldstein: That is right, and we claim it is.

Judge Wilkerson (continuing): If it is something that, under the 'Peculiar Knowledge' rule——

Mr. Goldstein: Right.

Judge Wilkerson: —it is their duty to show, and they fail to show it, then you are entitled to all of the instances——

Mr. Goldstein: Yes.

Judge Wilkerson: —which flow from that failure to show.

Mr. Goldstein: We want to show we made an attempt to get it, and it was refused us, and that is all.

Judge Wilkerson: You have asked for it.

Mr. Goldstein: Yes.

[fol. 7329] Judge Wilkerson: You have told them you want it.

Mr. Goldstein: Yes.

Judge Wilkerson: And you think that they should give it to you.

And further than that, you say 'Well, we will argue the inferences from that, when we come to argue the case.'

Mr. Goldstein: That is correct.

Mr. Haight: And further, we are telling them, we think it is a part of their case, and to that extent we are trying to aid them.

Judge Wilkerson: You are warning them.

Mr. Thompson: It is very kind, I am sure.

Mr. Haight: And if they will not accept the warning——

Judge Wilkerson: You are warning the plaintiff——

Mr. Haight: Yes.

Judge Wilkerson: —that you will insist, in your argument——

Mr. Haight: Absolutely.

Judge Wilkerson: —that that is an essential part of their case.

Mr. Haight: Yes.

Mr. Goldstein: Right.

Mr. Haight: And if they think that our suggestion of aid is worthless, why, they are taking the chance, if we happen to be right.

Judge Wilkerson: All right. You may go ahead."

(Statement by Mr. Goldstein:

"Exhibit X-76 is entitled 'Commercial Agreement between Western Electric Company, Inc., and Graybar Electric Company, Inc., dated December 31, 1925.'

Exhibit X-77 is entitled 'Distributor Contract between Western Electric Company, Inc., and Graybar Electric Company, Inc., dated October 11, 1928, effective November 21, 1928.'

Exhibit X-74-A is Electrical Research Products, Inc., and Graybar Management Corporation, and Graybar Electric Company, Inc., agreement covering changes in capital structure and sale of common stock of Graybar Electric Company, Inc., dated November 5, 1928.

Exhibit X-78, entitled 'Correspondence between Graybar Electric and Western Electric Company' consists of a letter [fol. 7330] dated January 21, 1926, from the Comptroller of the Western Electric Company to F. A. Ketcham, Executive Vice-President, Graybar Electric Company, Inc.; letter dated February 10, 1926, from Mr. L. M. Dunn, Executive Vice-President Graybar Electric Company, to R. H. Gregory, Comptroller, Western Electric Company, Inc.; letter dated January 18, 1927, from R. H. Gregory to F. A. Ketcham, Executive Vice-President, Graybar Electric Com-

pany; and letter dated March 4, 1927, from F. A. Ketcham, Executive Vice-President, Graybar Electric Company, to R. H. Gregory, Comptroller.

The above letters, Exhibit X-78, were furnished by the plaintiff, and state the arrangements between the Western Electric Company and the Graybar, regarding compensation to the Western Electric for services rendered during the years covered by these letters.")

The Witness (continuing): Exhibit X-79, entitled "Western Electric—Profits from operations of Electrical Research Products, Inc., and percentage of Return on Western Electric Company, Inc., investment" shows the profit from operations of Electrical Research Products, Inc., and the percentage of return to the Western Electric on its investment. The figures were taken from the reports furnished, which have been previously identified as D-74 and D-75. X-79 shows the total net profits of the Electrical Research Products as shown by the reports, line 1 of Exhibit X-79.

The line "Profits from Operations" shows net profits after deducting earnings on outside investments and marketable securities, and adding undistributed earnings of foreign subsidiaries.

This exhibit shows that on the average investment of Western Electric in Electrical Research Products, Inc., and excluding the investment in marketable securities, the return was in the year 1927, 93.3 per cent; in 1928, 121.8 per cent; in 1929, 309.4 per cent; and in 1930, 119.4 per cent.

Giving effect to the earnings not declared as dividends, and considering the undistributed earnings, such undistributed earnings as part of the Western Electric investment, the return on that basis was in the year 1927, 63.6 per cent; in 1928, 51 per cent; in 1929, 68.1 per cent; and in the year 1930, 18.2 per cent.

In Exhibit X-79 the difference between the two sets of [fol. 7331] returns, that is the return on the one which is shown on the line which shows 93.3 per cent in 1927, and 121.8 per cent in 1928, and 309.4 per cent in 1929, and 119.4 per cent—that is Western Electric Company investment in Electrical Research Products, not taking into account the undistributed earnings as part of the investment. Then by giving effect to the undistributed earnings as a part of

the investment, I show in the last column, in the last line, 63.6 per cent return, 51 per cent, 68.1 per cent, and 18.2 per cent.

Exhibit X-80, entitled "ERPI—Copy of Journal Entry No. 150, dated June 30, 1927," consists of two sheets, and was compiled from data furnished to us by the Western Electric Company, and explains the entries in connection with the transaction referred to in Exhibit D-82.

This exhibit shows that on June 30, 1927, a reserve of $1,000,000 was set up, and that on October 31, 1930, the reserve was credited to "Sundry Income," but reversed on the same date. The exhibit shows the journal entries and cash book entries relating to the $4,000,000 transaction referred to in Exhibit D-82. Of this $4,000,000 the reserve of $1,000,000 is still on the books of Electrical Research Products, and to that extent the profits of Electrical Research Products as shown in X-79, are understated.

Exhibit X-81 is entitled "Western Electric Co., Inc.—Return on Investment in Northern Electric Company, Limited" shows the return on investment of the Western Electric in the Northern Electric Company, which are applicable to the Western Electric investment.

Exhibit X-82, entitled "Western Electric Company, Inc. —Percentage of Return on Average Capital Stock and Surplus Allocated to Bell and non-Bell average investment based on a 10 per cent return on the average investment in Bell and non-Bell assets" is described as follows:

The first column headed "Average Investment per Plaintiff's Exhibits A-77 and A-79," is taken from those exhibits and shows the combined figure.

Column 2 shows the amount of earnings available for return on the basis of 10 per cent on the return on investment previously described.

Column 3 shows the total amount of capital stock allocated to the Bell and non-Bell business.

[fol. 7332] Column 4 shows the per cent return on average capital stock allocated to Bell and non-Bell business.

Column 5 shows the average capital stock and surplus allocated to Bell and non-Bell business. This column differs from the column "Average Capital Stock allocated to Bell and non-Bell business," by the inclusion of surplus, which is omitted from the former column.

The last column shows the percentage of return.

Exhibit X-83, entitled "Western Electric, Inc., and Subsidiaries—Consolidated Average Investment, Profits and Percentage of Return," shows the return on investment to the Western Electric Company from its operating earnings and from its non-operating earnings on a consolidated basis, using the Company's figures for net profits and for investment.

Exhibit X-83-A, entitled "Western Electric and Subsidiaries—Computation of Average Investment, per Touche, Niven & Company," shows the basis of arriving at the average consolidated investment before and after depreciation.

Exhibit X-83-B, entitled "Western Electric and Subsidiaries—Reconciliation of Consolidated Net Profits per company with Consolidated Profits as Adjusted," shows the adjustments that I made to consolidated net profits. Those adjustments of rate base and net profits are as shown in X-84.

Exhibit X-84, entitled "Western Electric and Subsidiaries—Consolidated Average Investment, Profits and Percentage of Return," gives effect to the adjustments which I have made. The adjustments in X-83-A and X-83-B are of similar character to those I have described in X-49 and X-50, except as indicated, and except so far as they may involve similar adjustment on subsidiary companies, and therefore need no further description.

Exhibit X-84 is before depreciation, and X-85 is entitled "Western Electric and Subsidiaries—Consolidated Average Investment, Profits and Percentage of Return." X-85 is identical with X-84, except that there is a depreciation reserve deducted.

Exhibit X-86, entitled "Western Electric and Subsidiaries—Consolidated Average Investment, Profits and Percentage of Return," gives effect to profits as adjusted on the Company's rate base.

[fol. 7333] The profit on the sale of the International Western Electric Company was included to a certain extent in the consolidated profits computed by Mr. Gregory. I have, in Exhibit X-86, added back the portion of International Profits which he allocated, which he did not take up in his consolidated net profit. I am not certain whether that is the portion which was allocated by him to the period prior to 1918. It represents $1,989,000. Then I took up the profit on the sale of the property to the Bell Telephone

laboratories, of $2,113,000. This is the only exhibit in which I reflect that profit. Then I took up the net profit of $457,000 on the sale of the Graybar stock. It represents the difference between the profit of $2,300,000 made on the sale, minus the amount of profit which Mr. Gregory already had included in the consolidated net profits of the Company.

Exhibit X-87, entitled "Western Electric and Subsidiaries—Consolidated Average Investment, Profits and Percentage of Return" gives effect to the average investment as adjusted before depreciation, shown in Exhibit X-83. The column, "Profits as Adjusted," is in conformity with Exhibit X-83-B. The last column shows the percentage of return.

Exhibit X-88, entitled "Western Electric and Subsidiaries—Consolidated Average Investment, Profits and Percentage of Return," is similar to Exhibit X-87 except that it gives effect to the added factor of reserve for depreciation which is deducted in Exhibit X-88. That is, it shows the effect of the net profits as I adjust them in the manner I stated before on the rate base as I adjusted it, after deducting depreciation reserve.

Exhibit X-88, for the period from 1923 to 1930, shows the following return on investment: 1923, 6 per cent; 1924, 11.3 per cent; 1925, 20.9 per cent; 1926, 14.7 per cent; 1927, 18.5 per cent; 1928, 21 per cent; 1929, 19.1 per cent, and 1930, 8.2 per cent.

Exhibit X-89, entitled "Western Electric—Basis of Published Figures of Companies included in Plaintiff's Exhibit A-85 (taken from Poor's Manual)" shows that of the 88 companies included by Mr. Gregory in his Exhibit A-85, practically all of them show, in Poor's, the earnings and assets on a consolidated basis, which includes the parent company as well as the entire operations of the subsidiary companies.

Exhibits A-77 and A-79 include only that portion of total [fol. 7334] investment and total earnings of the Western Electric Company itself, that Mr. Gregory allocated to operations, and do not include either the non-operating assets, or the non-operating earnings of the Western Electric Company, nor any of the earnings from investments or from profits in the subsidiary companies of the Western Electric Company.

Column 2, Exhibit X-89, shows the companies whose earnings are on a company basis of operating and non-operating income, and operating and non-operating assets, but not including subsidiary companies.

Exhibit X-90, entitled, "Western Electric—Comparison of Earnings and Rate of Return Computed on Basis Shown in Exhibit A-85, with that shown in Exhibits A-77 and A-79," shows a comparison between the return on investment on the basis of earnings and investment figures as taken from Poor's Manual, for the Western Electric Company.

Exhibit X-91, entitled, "Western Electric Company—Percentage of Return on—'Average net investment' (exclusive of bonded indebtedness) to 'Earnings Available for Dividends,' " taken from Poor's Manual, shows return on capital. It shows the return on capital and surplus based on non-operating assets and non-operating earnings of the Western Electric Company alone without taking into account any of the subsidiary companies for each of the years from 1915 to 1930, as taken from Poor's Manual without any adjustments of income.

Exhibit X-92, entitled, "Depreciation Policy of Companies, from Poor's 1931 Manual," is taken verbatim from Poor's—the depreciation policy, for the 88 companies. It is merely a compilation. It speaks for itself.

Exhibit X-93, entitled, "Western Electric—Plaintiff's Exhibit A-85—Depreciation Rates," is a grouping of the depreciation rates used by the various companies on machinery, furniture, buildings and small tools, indicating those companies, whose rates are in conformity with those approved by the Internal Revenue Department, taken from Poor's.

Exhibit X-94, entitled, "Western Electric—Adjustment to Surplus Accounts Omitted in Computation of Average Annual Earnings of Various Companies, included in Plaintiff's Exhibit A-85 (Debit Adjustments are shown in black; [fol. 7335] credit adjustments in red) surplus adjustments of 88 companies, 1931" is a compilation showing the kinds of adjustments to surplus made by 88 companies, of the same character that Mr. Gregory used in connection with his Exhibits A-77 and A-79 as charges to operating earnings. I have found from my examination of each of the 88 companies, in Poor's, additional facts which should be

taken into account in any comparison between the Western Electric Company and the 88 companies.

From an examination of some of the companies included among the 88 companies included in Exhibit A-85, I find that seven of the companies carried their inventories at cost. Those companies are: DuPont, Mathiesan Alkali Works; for the years 1926 and subsequent, the Consolidated Cigar Corporation and the Continental Baking Corporation; for the years 1927 to 1930, Ligget & Meyers Tobacco Company, and the Lorillard Company; prior to 1930, the Goodrich Tire & Rubber Company carried its finished and semi-finished products at cost.

I also found that three of the companies had employes' profit-sharing plans. The Dennison Manufacturing Company has management and employes stock, as extra compensation, but does not have a pension fund.

The Endicott-Johnson Corporation has a profit-sharing plan for employes. The National Cash Register Company employes receive the profit-sharing at varying percentages of the earnings after taxes, which was discontinued in 1926, at which time the employes received 37.5 per cent of the common B stock in lieu of the profit-sharing arrangement.

From my examination of the working papers underlying Mr. Gregory's Exhibit A-85, I did not find that any effect was given to this profit-sharing as deductions from operating earnings. I also found that several of the companies were engaged in businesses that are rather far removed from the business of the Western Electric Company. The Columbia Carbon Company owns gas wells, oil wells and pipe lines. There were six companies that owned mines, the Allied Chemical & Dye Corporation, the Glidden Company, the Goodyear Tire & Rubber Company, The International Cement Company, The International Harvester Company and the National Lead Company.

[fol. 7336] Three companies owned phosphate, sodium and/or limestone deposits, the American Agricultural & Chemical Company, the American Cyanamid Company, and Mathieson Alkali Works.

Three companies own timber lands, the Deere Company, the Diamond Match Company, and the International Harvester Company. Two companies have rubber plantations, the Goodyear Tire & Rubber Company and the B. F. Goodrich Tire & Rubber Company.

This list is not intended to be all inclusive, but is simply a sampling of some of the companies included among the 88. The effect of engaging in mining, in oil, and also in timber operations, would involve the question of depletion of return and reduction of investment in those particular assets.

Exhibit X-95, entitled, "Western Electric—Comparison of per cent of return on investment and per cent of net profit to sales of companies shown in Plaintiff's Exhibits A-85, A-86 and A-87," shows a comparison of percentage of average earnings to average investment, with percentage of net profits to sales on representative companies of the 88 companies. It shows that there is no relation between the two percentages.

Exhibit X-96, entitled, "Western Electric Company, Inc. —Ratio of sales to average investment for year 1927 (compiled from Poor's Manual)," compares the ratio of sales to average investments of the Western Electric Company for Bell and non-Bell business, and also for Bell and non-Bell combined, showing the ratio of sales to the average investment—with ratio of sales to average investment of those of the 88 companies included in Exhibit A-85, which showed a large percentage, net profits to sales. This exhibit shows that the percentage of net profits to sales has a relation to the rate of turnover, and that the larger the turnover, the less percentage of profit to sales, appears.

Exhibit X-97, entitled, "Western Electric Company, Inc. —Results obtained by apportioning combined plant of two companies (selected from Plaintiff's Exhibit A-85) on basis of the combined sales for the year 1930," shows the effect of apportioning plant on the basis of cost of sales where fast and slow moving items are combined. It shows that an ap- [fol. 7337] portionment made of plant on basis of cost of sales will not be in accordance with the use, which is the basis used in Mr. Gregory's exhibits. Cost of sales will not give you the use of a plant, for the simple reason it involves the question of inventories. In other words, it brings in the question of goods manufactured in the prior year, for sale in subsequent year.

As an illustration you might take an extreme case, goods manufactured in the year 1927 and sold in the year 1928, and we will assume that the goods manufactured in 1927 were of a type that was discontinued at the close of the year 1927, but that the merchandise itself was sold in the year 1928. If you use the apportionment in the manner in which

Mr. Gregory has used it, you would be apportioning to those sales in 1928, part of the 1928 plant, which would in no way be related to the plant used in the year 1927; that is, the year in which the goods were manufactured.

Exhibit X-98, entitled, "Western Electric—Collections from Bell Companies—(WE Schedule Reference CM-714)," shows the collections by the Western Electric Company from the Bell Companies, in Column 1, and Column 2 shows the cash taken by the licensee companies from the American Telephone & Telegraph Company, as shown in reports CR-13. The last column shows the ratio of one to the other.

Exhibit X-99, entitled, "A. T. & T. Co.—Investment in Western Electric Co. Common Stock (New York Corporation)," shows the investment by American Telephone & Telegraph Company in the common stock of the Western Electric, and was prepared from data furnished by American Telephone & Telegraph Company.

Exhibit X-100, entitled, "A. T. & T. Co.—Monthly High, Low and Average price of the common stock (per New York Stock Exchange quotations), 1920-31."

Exhibit X-101, entitled, "Illinois Bell Telephone Company—Sales of Illinois Bell Telephone Company's First and Refunding 5% Bonds—Series A—1956 (New York Stock Exchange) (Taken from 'The Analyst')," shows the year's sales, or resales of the Illinois Bell Telephone Company 1st and Refunding 5 per cent Bonds, Series A, 1956, on the New York Stock Exchange, as taken from the Analyst.

[fol. 7338] I requested of the Western Electric Company and was furnished Defendants' Exhibit X-102, entitled, "Analysis of profits on business other than the Bell Telephone Companies from 1881 to 1927, inclusive." I requested from the Western Electric Company the underlying data supporting Exhibit X-102.

In answer to that request, I was advised by the Western Electric Company that the underlying papers—the working papers underlying the Exhibit D-61 of which this shows the detail by years, would be furnished in Chicago, and then subject to the approval of counsel.

Cross-examination.

By Mr. Thompson:

I said in my direct examination that there were three companies included in the list of 88 companies that had profit-sharing arrangements with their employes. I am

familiar with the practice of only one of the companies, as to whether the profits which were shared with the employes were deducted from the profits as shown in their reports, included in Poor's and Moody's Manuals. In that company, the profits paid to employes were deducted as an operating expense, with the result that its profits were understated to that extent, in Poor's and Moody's Manuals. I do not think that the comparison shows the earnings of these three companies as lower than they actually were.

In the case of the Endicott-Johnson Company, I am under the impression that Mr. Gregory excluded that profit-sharing arrangement. This profit-sharing affects the comparison between the Western Electric Company and these 88 companies, in that in most cases the profit-sharing arrangement is in lieu of a pension fund. In the case of the Western Electric Company, the pension fund is deducted as an operating expense, and in other cases of profit-sharing arrangements, it is a form of profit-sharing which does not enter into normal operations. It affects the statement of earnings of one of the companies, Endicott-Johnson, as shown in the exhibit including the 88 companies. That means that if they have taken part of their earnings out before they reported them to Poor or Moody, their earnings are lower than they would have been if they had left it in, but I wish to point out that in Exhibit A-85, effect has been given to that factor. I think there is a point to it.

[fol. 7339] Whether in Exhibit X-79 an attempt is made to show the earnings made by the Western Electric Company on its investment in Electrical Research Products depends upon what you mean by "earnings on its investment." By the statement "Profits from operations of Electrical Research Products and percentage of return on Western Electric Company investment," I mean that it shows the percentage of return, using as the basis, the profit from the operations of the Electrical Research Products, as compared with the original dollar investment of the Western Electric Company. In 1927, the line which says "Average investment of Western Electric Company," $2,299,000, is not the dollar investment of the Western Electric Company in Electrical Research Products capital stock for 1927. It excludes the investments and marketable securities; it represents the cash and accounts receivable that were turned over by the Western Electric Company to the Electrical Research Products, in lieu of capital stock. It is excluding

investments and marketable securities which were turned over at the same date. I say, as a result of this exhibit, that the Western Electric Company earned in the year 1929, 309.4 per cent on the average investment of the Western Electric Company in Electrical Research Products, excluding investments and marketable securities of Electrical Research Products. In arriving at that figure I have included undistributed earnings of foreign subsidiaries for that year in the sum of $2,130,000. The investment of Electrical Research Products in those foreign subsidiaries does not enter into the calculation.

"Q. No, it does not enter into the calculation at all. Of course, if the Electrical Research Products had large investments in its foreign subsidiaries, and you bring in the profit, and you do not bring in the investment, it is not hard to get a figure of 309, is it?

A. But I am calculating the return to the Western Electric Company. The Western Electric Company had an investment of $2,250,000 in Electrical Research Products.

Q. Well, does not this 309.4 per cent attempt to show that there was that large earning by the Western Electric Company on the basis that you think is the fair and proper basis to set up in an exhibit, or is this just a calculation?

[fol. 7340] A. This is an attempt to show what the earnings actually were."

I stand back of this figure of 309 per cent as the earnings of the Western Electric Company on its investment in Electrical Research Products. I showed $2,130,000 of earnings made by Electrical Research Products from its foreign subsidiaries, without reflecting or giving any effect whatever to the investment of Electrical Research Products in its foreign subsidiaries because the subsidiaries are owned wholly by Electrical Research Products. Electrical Research Products has money invested in them. As an accountant I do this because I am calculating the return of Electrical Research Products and subsidiaries, the return of the Western Electric Company, and all of the money that the Western Electric Company has invested in the entire Electrical Research Products organization, was $2,250,000.

In my opinion as an accountant, that is a proper basis upon which to make a calculation on which to determine earnings. There may have been an internal profit on Electrical Research Products sales to its subsidiaries, on inven-

tories which were not disposed of during this period of time. That was not excluded from their profits because I had no basis of arriving at it.

"Q. Well, you are setting this up to show what the profits were. Did you make any inquiry to ascertain whether that was a fact, and if it was a fact, how it would affect this calculation?

A. I used the best available information that I could get.

Q. Well, this is an affirmative piece of work that you have done, which results in showing perfectly tremendous profits made by the Western Electric Company here. Did you not want to know whether this was a correct calculation or not?

A. Well, I am restricted in any calculation that I may make, by the data which is made available to me.

Q. Did you inquire about that?

A. I did not inquire about the profits which may have been—which might have been in unsold merchandise,—but I feel that such an effect would not be very material, because if it is taken out of one year, it would be reflected in another year.

[fol. 7341] Q. Well, how do you know how it can affect one of the years, if you do not know what it is? If you have no idea as to the amount, how can you say it is not material?

A. Well, the question of inventories only affects one specific year. Eventually profit is to be picked up, whether it is to be picked up in one year, or picked up in another year.

Q. No, but this is consolidated—you are trying here to find out, not the difference between an inventory of one company, and the same company in another year, but where there are subsidiaries, where there is an inter-company profit?

A. Well, the only inter-company profit would exist between Electrical Research Products and its subsidiaries."

I do not know whether it is a fact that Electrical Research Products was largely financed by means of loans made by the Western Electric Company, to Electric Research Products, rather than by stock issued by Electrical Research Products itself, or by a bond issue. I never studied that phase of the situation. I do not think that it was important, when I was trying to find out what the return to the Western Electric Company was, to ascertain the method of financing of Electrical Research Products. If I had found out that there were large loans made con-

tinuously by the Western Electric to Electrical Research Products, so that it was really financed through loans, I do not know that I would have changed the exhibit so as to include those loans as a real part of the Western Electric's investment, nor found out the return not only on these small figures that I have put in here, but on the larger figures including the loans.

I do not know what I would have done if I had found that out. I cannot answer a question like that without giving it some thought.

"Judge Wilkerson: Suppose we take an extreme case; suppose the company actually had, as its investment, $1,000, as far as its investment was concerned, but as a matter of fact, the entire investment in the business is more than $5,000,000.

Would you in estimating your profit, take the per cent on the $1,000, or the $5,000,000?

The Witness: It depends on who contributed the $5,000,000. If the $5,000,000 was borrowed, if it was borrowed from the banks——

[fol. 7342] Judge Wilkerson: I am assuming that the Western Electric Company contributed it.

The Witness: You can calculate the basis—the return on two bases. You can calculate it on the original investment——

Judge Wilkerson: Well, is there any system of accounting by which it could only be figured on the $1,000?

The Witness: I think there is.

Mr. Thompson:

Q. No, but that is what you have done here, is it not? That is what you have done here deliberately.

A. I have not done it deliberately."

In getting up Exhibit X-79, I had in mind showing the profits from operations of Electrical Research Products, on an operating basis only, excluding the non-operating income.

"Q. Mr. McCann, I notice that on some of the exhibits that were introduced this morning, the legend "Per Touche, Niven & Company." As I understand it, you have done this work, flowing into all of these exhibits, on behalf of the firm of Touche, Niven & Company, is that correct?

A. That is correct.

Q. Now, I want to hand you this Exhibit X-79, and I want you to assume that Electrical Research Products wants to put out a bond issue, and it wants to go to the public with that bond issue, and I represent the bankers, and I come to you with that statement. Will Touche, Niven certify that, as a correct statement of the return on investment, on which bonds are to be sold to the public?

A. Well, to begin with we could not certify it, because I have accepted all of the figures from the company; I have not verified any of these figures.

Q. Oh, no——

Judge Wilkerson: Assuming the accuracy of the figures.

Mr. Thompson: Yes, assuming the accuracy of the figures. Will you certify them to be——

Judge Wilkerson: Assuming the accuracy of the figures, would you certify this method of estimating the per cent of return?

Mr. Thompson: Yes, to the public that is going to put its money into bonds on this property.

The Witness: You cannot answer a question yes or no— [fol. 7343] on a question like that. It involves too many outside elements."

Exhibit X-67 is an attempt to show the return on investment of the Western Electric in the International Western Electric for the years 1918 to 1925. That is just the dollars actually invested; it is not the money left in the business from earnings at all. The second thing is that I have included in here as one of the large factors affecting it in the earnings shown, $15,955,095 of profit on the sale of the International Western Electric Company.

I believe that that company, its affiliates, and its predecessors, conducted a business abroad from about 1882 until 1925. The profit on the sale of that business does not necessarily represent the undistributed earnings in the business from 1881 down to 1925. It represented the profits they made in 1925 when they sold the business.

I say it was all applicable to the period, 1918 to 1925. I offered as a reason for including it all in that period, that there were certain statements in the stockholders' reports of the Western Electric Company that showed first that it had sustained capital losses during the war period abroad, and second, that it had not made any money in this business abroad during the war. I cannot give you the page numbers,

but the statements appear in the annual reports for the years prior to 1920. (Counsel handed witness annual reports for years 1918 and 1919.) The report for the year ending December 31, 1919, and the report for the year ending December 31, 1918, are the reports I saw and referred to in my testimony yesterday. They are the reports I rely on. I do not know whether you have correctly marked the extracts that I rely on. I do not know, because I went through the entire report. I could not state the pages.

Those particular reports are one of the factors that I relied on. I also relied on the contention that the profit is made when the sale is made; that the profit on a sale of a business is not to be allocated over any period of years. I relied on the two taken together.

If the Western Electric Company had an investment in the International Western Electric Company and its predecessor corporations covering the period 1881 down to 1925, and those companies had made substantial earnings from [fol. 7344] 1881 continuously down to December 31, 1917, which had been left in the business and then in 1925, the Western Electric Company sold its stock ownership in the International Western Electric Company, if I were going to figure the return on Western's investment for the period 1918 to 1925, I would include the profit in the year in which the sale was made, no matter what year they were made in.

"Q. Without respect to when the earnings of the Company had been made, whose stock was sold, and resulted in the realization of a profit?

A. You are drawing the inference that the profit——

Q. No, I am drawing no inference. I am asking for your opinion.

A. Well, you have made the statement that the profit on the sale is related to earnings. That may or may not be related to earnings for proper years.

Q. Do you know what the fact is in this case?

A. I know that the Western Electric Company made a profit of $15,000,000, but I do not know why."

In a number of my exhibits, I have apportioned the unexpended balance to the reserve for depreciation between the Bell and non-Bell investment. I did not follow the method which Mr. Gregory used in making this apportionment because to my knowledge there were no working papers available at the time I made my apportionment. I mean that I

made my apportionment before Mr. Gregory introduced Exhibit A-194, which showed an apportionment. I couldn't have followed his method. I used the method which is the only basis which I could see could be used, in the light of the facts I had. I wouldn't say that my method correctly reflects the apportionment of the unexpended balance in the reserve between Bell and non-Bell. All of these methods of allocation are subject to argument. There is no such thing as correct or incorrect. It is a matter of opinion. I wouldn't say that my method was right. It was the only one that I could use, in view of the data which was furnished me by the Western Electric Company.

I would not say that any allocation I made between Bell and non-Bell is the proper method. I merely tried to use some method that would give a result as between Bell and [fol. 7345] non-Bell, without attempting to pass on the propriety of any method that was used by Mr. Gregory, or any method which I might adopt. I prepared this exhibit where I allocated an unexpended balance in the reserve for accrued depreciation between Bell and non-Bell business long before I saw Mr. Gregory's exhibits. I could not have followed any method that he used because he had no apportionment at that time. I was confronted with the necessity of making an apportionment between Bell and non-Bell, and I chose a method of apportioning that on the basis of average plant investment. It is the same thing as the average plant invested as reflected in Mr. Gregory's exhibits.

"Q. Now, you did that because you believed that apportionment made by that method would be substantially and approximately correct? Or didn't you believe that it would be correct?

A. I am not passing on the correctness of the apportionment.

Q. I know; but you introduced an exhibit here, not based on any method used by Gregory, where you chose your own method of apportionment, and I want to know now, whether you say it is right, or whether you repudiate the method you used?

A. I do not repudiate the method, because I used the apportionment of the reserve for depreciation—I used the same apportionment of that reserve as Mr. Gregory used of his plant account. I had no means of telling how much of the amounts of reserve applied to one class of plant, or another class of plant.

Q. And you put up an exhibit in which that is an important part of your work, in making your apportionment of this reserve for accrued depreciation between Bell and non-Bell. I want to know whether you say to the court that the method used in the exhibit will give an approximately accurate result, or whether it gives no result.

A. I can answer it in this way: That in view of the facts that there were at my disposal, it was the only apportionment which I could think of that I could make.

Q. Do you say it gives an approximately accurate and fair result, so that when the court looks at these exhibits where you have attempted to apportion this unextended bal- [fol. 7346] ance in the reserve between the Bell and the non-Bell business, he will get a substantially accurate picture of the amount that you say ought to go against the Bell business. Now, either he can or he cannot. I want to know which.

A. Well, if you attack my apportionment of the reserve, you attack your own apportionment of the plant account.

Q. I am just asking you the question. You have used it now. We didn't use it at all in that connection. I want to know whether you say that by using it, you get an approximately correct answer.

A. I say that it is the best apportionment that I could make, in view of the facts which were at my disposal."

I have presented exhibits prepared by me, in which I am proceeding upon the theory that the average investment of the Western Electric in its Bell and its non-Bell business, should be reduced by the unexpended balance in the reserve for accrued depreciation. In order to do that I have to apportion that unexpended balance between Bell and non-Bell business. I did not have the Western Electric Company exhibit and could not use their apportionment, so I had to make an apportionment of my own. I would say that the basis I had to choose from was rather limited. I had very little information. I had to make it on some basis.

"Q. Do you represent to this court that you have made it on a basis that will give an approximately fair and correct answer, or is it to be disregarded? I want to know, one or the other, without equivocation.

Mr. Goldstein: Mr. Thompson, will you explain whether you mean now as a result of the allocation of depreciation reserve, or the result of the rate of return? Which are you

talking about, you are confusing this witness by the two things. One has nothing to do with the other.

Mr. Thompson: No.

Mr. Goldstein: Let's get the question straight, so there will not be any ambiguity.

Mr. Thompson: There is no confusion, no ambiguity.

Q. You understand, don't you?

A. I don't think I do follow you; I have answered you about four times, and each time you go back to the same question.

[fol. 7347] Q. All right. Now, what do you think I am trying to get at? Don't you know?

A. You have asked me why I used that particular apportionment.

Q. Yes.

A. What I have tried to explain is, it was the only one available, the only available basis that I could use.

Q. Now, let's follow through, and I am only trying to get your view of this Mr. McCann. You set up certain exhibits that you ask the court to take, which are based on the theory that there should be deducted from the average investment in the Bell business, and the average investment in the non-Bell business the unexpended balance in the reserve, is that right? You understand that step now thoroughly?

Mr. Thompson:

Q. Do you understand my question, Mr. McCann? After Mr. Goldstein's statement, you don't understand it now, is that right? You told me a minute ago you did.

Mr. Goldstein: We would like to know what apportionment you are talking about, because that is the vital part of this case, and you are trying to bring two thoughts into one question, and we have a right to know which thought you are talking about.

Mr. Thompson:

Q. Can you understand the question, or can't you?

A. I am afraid I can't, at the present time.

Q. All right. We will pass it. The amount of two million dollars is included——

Judge Wilkerson:

Q. In your opinion, is the basis as stated there, the correct basis?

A. Well, that all depends on the circumstances. I have made a very limited examination of these records, and if I had made the apportionment of plant as well as the apportionment of reserve, I might have adopted an entirely different basis; but Mr. Gregory made the apportionment of plant.

Judge Wilkerson:

Q. The whole point is, what do you expect us to do with the exhibit, what are we to do with it? What do you think it shows to us?

[fol. 7348] A. I think it represents as good an apportionment as I could make, under the facts which were presented to me.

Q. But you are not prepared to say that in your opinion it is correct?

A. That is right."

I did not follow Mr. Gregory's method in apportioning this unexpended balance in the reserves. As I stated before, his apportionment was not made at the time I made mine, but his apportionment was examined by us subsequently, and in my opinion the difference between his apportionment of the reserve and my apportionment is not material to the case, except in so far as it affects the extraordinary depreciation reserve. In other words, I do say that there are differences, but they are not material.

I said I did not follow Mr. Gregory's method, but I believe, in my opinion, that the differences between the two methods are immaterial. I think they are both substantially in agreement, except as far as the extraordinary depreciation reserve is concerned. I would not pass upon the correctness of the method used.

The amount of two million dollars which was included in Mr. Gregory's exhibit as an operating expense on account of depreciation on machinery in the year 1928 first appeared on the books in 1928. A portion of that could have been claimed in an amended income tax return of the Western Electric Company, for the years 1924, 1925, 1926, 1927.

I was furnished with a reconciliation of the books with the income as finally determined with the Income Tax Department, and as shown by amended returns for the later years, and that item appears as one of the items of reconciliation, showing it was not taken up in the Federal Income Tax Return.

I don't know whether the Western Electric has made a claim to the Government on account of this $2,000,000, but I do know that the reconciliation which they furnished me, which purports to be a reconciliation between their Federal Income Tax returns and the books, shows this as an item of reconciliation. I have not examined their tax file correspondence, so I cannot pass upon whether they have asserted a claim with reference to this. I am familiar with [fol. 7349] the general method in which these things come up with the income tax authorities in the larger corporations. A field examiner comes around to examine the reports many years after they are made.

I know this. I was furnished a reconciliation of the Federal Income Tax returns as filed with the profits on the books, and in that reconciliation the item of two million dollars referred to by Mr. Thompson appeared as an item which was not claimed as a deduction. Now, whether they made a claim subsequent to the return, I don't know. But I do know that in the return as filed, as amended, it was not claimed. What has happened afterwards, I don't know. I don't assert anything in respect to it one way or the other, except so far as it affects the Exhibit 66.

During the course of my employment on behalf of the defendants in this case, I was requested to make some examination of the 1931 records, at a time quite subsequent to my first employment. I made an examination of 1931, but not to the extent that I made of the prior years, because of the lack of sufficient time. I furnished the work sheets on 1931 to Western Electric employes for checking, but they were not furnished as such. It merely happened that the 1931 figures were inserted on the working papers where they happened to fit in.

The following exhibits fail to include any figures as to earnings on investment, or any other figures with respect to the Western Electric Company for the year 1931; X-48 to X-65, inclusive; except X-49-A, which is a Western Electric statement. X-81 to 88, inclusive, X-99, and X-79. I don't believe any of the exhibits introduced through me cover the year 1931. The exhibits were prepared long before we had any access to the 1931 figures. When we began our work, the only figures available were for the years 1916 to 1930. Mr. Gregory's statement, with which we are drawing comparisons, cover the same period, so there was no

reason for including the year 1931. I did not have access to the books and records of the Western Electric Company for 1931 long before I went on the witness stand. We requested the right to examine for 1931 all the same books and records as we examined for the other years.

"Q. You made whatever examination you pleased of them?

A. I was restricted as far as time was concerned."

[fol. 7350] I don't mean that I didn't have the time to devote all my time to this examination. I had access to the 1930 figures back in January. As a matter of fact, I made no examination of the 1931 figures until away into April.

"Q. Do you know from Mr. Gregory's figures on his exhibits that the earnings of the Western Electric Company in its Bell business are the lowest for the year 1931 that they had been for any year in the period 1923 to date, except for the first part of 1932?

A. I am not familiar with the 1931 figures.

Q. Weren't you interested in the 1931 results?

A. Not particularly.

Q. Did you, yourself, determine that 1931 would not be put in here?

A. Well, I was instructed to prepare exhibits that would be comparable to A-77 and A-79, and, as I explained before, the exhibits were prepared long before I had any access to 1931 figures.

Q. Now, since you have had access to them, you know that the year 1931 is included in this controversy, don't you? You did know that, didn't you?

A. I don't know that I did. Mr. Gregory's exhibits A-77 and A-79 do not include 1931.

Q. But 78 and 80 do?

A. On an estimated basis.

Q. Yes, exactly, and then figures were brought in later. You knew that, didn't you, when the figures for 1931 were brought in. What I want to know—I am not going to pursue this further—I want to know whether you, as an accountant, determined that the year 1931 was not to go in this case, or whether some one else determined that.

A. Why, I did not determine anything relative to the year 1931.

Judge Wilkerson: I understand you to say you followed instructions?

A. When I first made up my exhibits, the year 1931 was not in the case, the figures were not available, the books were not available, and I made the exhibits."

In our Exhibits X-50, X-53 to 58, inclusive, 84, 86, and X-88, I have made certain adjustments on account of pension fund accruals, assuming that the exhibit numbers are correct. I will accept your figures subject to check that in [fol. 7351] these exhibits for the years 1916 to 1930, I have made the following adjustments to profits on account of this pension fund situation: I have increased the Bell profits by $1,558,000, I have reduced the non-Bell profits by $517,000, and I have increased the profits on the total business by $1,041,000.

I will accept your figures, subject to check that for the period 1923 to 1931, I increased the Bell profits by $5,912,000, the non-Bell profits by $1,350,000, and the total profits by $7,262,000.

The adjustments covering pension fund accruals all proceed upon the theory that the Western Electric Company had accrued larger amounts for Pension Fund purposes applicable to both its Bell and non-Bell business in the two periods than correct actuarial computations justify. In determining what the proper actuarial computations were, I used a statement identified as Exhibit D-26, the title of which reads as follows: "Actuarial computations of required pension fund accruals, 1916 to 1930, and minimum fund requirement." This sheet was furnished to counsel for the City of Chicago by the Western Electric Company. I don't know the date. I did not know by whom it was prepared. I did not know that after a controversy had arisen here in court, the company employed Dr. Arthur Hunter, chief actuary of the New York Life Insurance Company, to determine what the facts were in this connection. I did not see Dr. Hunter's exhibits before I put these exhibits in, that contained the adjustments on the pension fund accruals. I did not know that he had testified. I do not, by my exhibits or my testimony, undertake to express any opinion about the facts from an actuarial standpoint.

Fundamentally there was no difference in the method of my apportionment of these pension fund accruals between Bell and non-Bell business for the period prior to 1925 and

for the year 1925, and subsequent thereto. By use of the word "fundamentally" I mean that I attempted, in so far as possible to make the apportionment between the Bell and non-Bell on the same basis throughout.

It may be substantially different here due to the item of $1,400,000, which is the Graybar pension fund. Prior to 1925, the apportionment which I made was based on the cost of sales—I presume supplies were included. I don't know as [fol. 7352] a fact. I will have to examine my working papers before I can say whether, after 1925, my apportionment was based upon the Western Electric Company's method, which means that adjustments were apportioned on the basis of salaries, where, for instance, the installation and distribution houses were all Bell, and, in the case of the manufacturing department, the apportionment was on the basis of cost of sales.

"Q. I wish you would. You don't need to do it now. Then I want you to answer this question: If it is not a fact that, even upon your own theory, your method of apportionment prior to the year 1925 results in penalizing the Bell business, that is in increasing the profits on account of its pension fund accrual by approximately a million and a half more than you would have increased them if you followed the same method of this apportionment as you did follow for the years 1925 and subsequent thereto?

A. I can't answer that question, for I don't know.

Q. Will you look into it? I would like to have it answered.

A. I am afraid that it would involve considerable work on my part, and I don't think I should be called upon to do it.

Mr. Thompson: Well, your Honor, it is a curious situation; he brings in exhibits that make certain apportionments.

Mr. Goldstein: He accepted your figures.

Judge Wilkerson: Well, he will be governed by instructions of counsel, I suppose, as to what he will do, and they have called on you for a good many things.

Mr. Thompson:

Q. Do you decline to do this job?

A. It is not a matter of declining, Mr. Thompson. It is just a matter of, I don't know what the result would show

if I used any other basis. I have used the basis, I defined the basis.

Q. I ask you specifically whether there was a difference in the methods between these two periods; you say you don't know, you are going to answer that question?

A. I am going to answer that question by reference to my working papers.

Q. Will you also let me know tomorrow whether you decline to undertake or will undertake this other——

A. Yes.

[fol. 7353] Q. —this other investigation?

A. Yes, I will answer."

(Documents marked for Identification Exhibits A-216 and A-217, respectively.)

Exhibit A-216, being a statement furnished by the Western Electric, marked D-25, was before me when I did my work on Exhibits X-50 and X-53 to X-58, inclusive.

Exhibit A-217 is one of my work sheets. In Exhibit A-217, in the total additions to the fund opposite the year 1925, I have $4,977,000. I have a note to that which says that it includes $1,400,000 for pension fund, under agreement with the Graybar Electric Company. I come over to sheet D-25, furnished by the Western Electric Company, and I say that they have not included credits for pension fund accruals on the exhibits $1,400,000, because they use the figure there $3,576,305. What I did was to compare the total pension fund accruals for 1925, including the $1,400,000 for the supply department, against the pension fund accruals per actuarial computations, and I get a difference of $1,373,000, by which sum I adjusted profits. I do not see how it is $1,400,000 too much. The $1,400,000 that is in here is not in this figure. But the $1,400,000 is on the books in that particular year as a charge against non-Bell earnings. I was trying to adjust the figures which had been used by the Western Electric as credit for pension fund accruals, to the actuarial computations.

"Q. Now, in making that adjustment in every other year but 1925, you followed D-25. In 1925, you made the comparison as against a sum which included $1,400,000 reserve for pension fund for the supply department of the Western Electric, which had not been used by the Western Electric?

A. It is included in the Western Electric expense for that year.

Q. Exactly, but not reflected in these exhibits on account of the pension fund?

A. Not reflected in these exhibits.

Q. Nor any other exhibits?

A. But it is still reflected in the profits for the year. By doing this, I am not only adjusting the difference between this exhibit and the one showing actuarial calculations, but I am also excluding from profits the $1,400,000.

[fol. 7354] Q. That is the effect of it, isn't it?

A. Yes."

My understanding is that the $1,400,000 was included as an expense in Mr. Gregory's non-Bell exhibits.

I don't believe I was present; I do not recall hearing Mr. Gregory's testimony that, in making up his pension fund accruals, he had not included the $1,400,000 in the pension fund expenses of the supply department, that is, the non-Bell business. The most that I say for this is that it is not really an adjustment on account of pension fund, which it purports to be, but it is an adjustment to take the $1,400,000 out of the earnings of the Western Electric in its non-Bell business for that year.

It is included there merely because it related to pension fund, not to that specific calculation of pension fund, but it represented a pension fund set aside at that time for the Graybar employes. It is a proper adjustment in the exhibits. It is on account of pension fund that it is earmarked especially; I would not have to star it otherwise.

"Q. But when you came to make the comparison, while you earmarked it, when you came to make the comparison, you compared it, did you not, with the figure used by the Western, which did not include that sum, with the result that you got an adjustment of $1,400,000 larger than it would have been if you had used all the figures which have been used by Western in setting this up?

A. If I had adopted the method you describe, I would have shown the $1,400,000 in one separate column, I still would have made the adjustment of $1,400,000.

Exhibit 51 consists of three sheets, and purports to show average investment of the Western per Exhibits A-77 and A-79 adjusted before depreciation, net profits per Exhibits A-77 and A-79, and average return on investment.

Q. Now, you carried out these figures here, average return on investment. Are we to understand that this exhibit purports to show, as to the Bell business on the second sheet, what you believe to be the return on investment on a proper basis, or is this merely a calculation?

A. It is a calculation for the purpose of showing the effect of the adjustments that were made to the average investment as compared with Mr. Gregory's profits.

Q. But you do assert that the whole exhibit is on a basis [fol. 7355] so that the return on investment appearing in the third column means something?

A. I think that is self-evident from the exhibit itself. I have excluded from the average investment in column 1 of this exhibit (sheet 2, which is the Bell business), the notes payable to the trustee of pension fund and the American Telephone & Telegraph Company and to others, in a cumulative amount, for this entire period, of many millions.

Q. As a matter of fact, you have not decreased the profits at all by deducting from the profits $15,753,000 of interest applicable to the notes which you excluded?

A. Well, the purpose of this exhibit was not to show the investment and the profits on a comparable basis. It was merely to show the effects on the investment of these deductions.

Q. Mr. Witness, you not only show the average investment as adjusted to the net profits, but you carried out a return on investment?

Now, I want to know whether you say that doesn't mean anything, or, is the court to take that return as indicating anything?

Mr. Goldstein: Now, which exhibit are you now speaking about?

Mr. Thompson: Fifty-one, the second sheet.

A. Why, I think the exhibit speaks for itself.

Mr. Thompson: What I understand you did was this——

A. I admit that as far as the interest on the notes that are deducted here—as far as that interest is concerned, it is not taken out of this figure.

Judge Wilkerson: Pardon me just a moment. I suppose, having put this in, that we are to understand you

testify that the return on average investment before depreciation, is represented by these percentages which you put down in these columns, is that right?

A. Yes, but that is only one of the exhibits leading up to what might be called a final exhibit, where the adjustments are shown both on the assets and on the profits. It does show the effect of the asset base alone.

Judge Wilkerson: What I mean is, we don't want to be confused by this column headed "Percentage."

Mr. Thompson: Exactly.

[fol. 7356] Judge Wilkerson: We have a large number of exhibits here. Now, we take these exhibits and look at them. Are we to understand that you testify to something here about those percentages? What is your testimony about the percentages?

The Witness: I don't think I have testified to anything about percentages on this exhibit.

Judge Wilkerson: Well, what functions then do they serve?

Mr. Thompson: Exactly.

Judge Wilkerson: I say, what is their purpose in the exhibit? Are they evidence in the case, and if so, of what? Just what conclusion are we to draw from those percentages? That is what I am trying to get it. That applies not only to this, but to a large number of the exhibits. You have all kinds of percentages set out. Now, just what are we to do with those?

The Witness: Well, you understand, of course, that where you have two factors, this is, you have a factor of investment and a factor of profits, and you want to give effect to just one of the factors, naturally any comparison drawn between an adjustment on one factor without a corresponding adjustment on the other factor, does give an incorrect picture, but——

Judge Wilkerson: Well, in this case we have to make findings, and one of the findings which we will have to make will be the per cent profit of the Western Electric on its business, on the business with the Bell Company. Now, when we come to set down in our findings that percentage that we are required to find in this case, what use can we make of your column here? That is what I am trying to get at?

The Witness: Well, there is a later exhibit that adjusts both the profits and the rate base.

Judge Wilkerson: Is there an exhibit to which all these refer——

The Witness: Yes.

Judge Wilkerson (continuing): —which gives your idea as to what the profit is?

The Witness: Yes, and that is stated in the testimony.

Judge Wilkerson: All right."

I have a later exhibit in which I make adjustments to profits, and not to average investment. We have still another exhibit, our final exhibit, in which we adjust [fol. 7357] both profits and investment. This Exhibit 51, in all three of the sheets, I have adjusted by reducing the average investment, by taking out millions of dollars of notes payable. I have not decreased the profits by taking out the interest of more than fifteen and three-quarters million dollars applicable to the very notes that I have taken out. And the result is that my return shown in the third column here is correspondingly higher by the effect of that fifteen million dollars.

What has just been said with respect to Exhibit 51 applies equally to X-52, all three sheets of it. It applies to X-53 except that the conditions are reversed, the profits are adjusted, and not the investment. It applies to X-85. It does not apply to X-87. There are adjustments made in X-87 to profits and adjustments made to average investment. It applies to X-86.

What was said about the Exhibits X-51, X-52, X-85 and X-86, so far as reducing the investment by excluding notes payable to the trustee of the pension fund and others applies equally to the exclusion by me of excess cash, but not eliminating from profits the interest received on such cash.

Now, about these notes payable, I did not know that from 1927 to the present time the Western Electric Company has borrowed from the trustee of the pension fund all of the amounts in that fund, but I assumed from the size of the notes that it was practically all of the amounts. I do not know whether any of that has been repaid or not. Before I could say whether the Western Electric has had that money borrowed continuously from the trustee of the pension fund during a period commencing in 1927 down to and including the present time, I would really have to see that it was outstanding all the time. I did know it

was outstanding at the end of each year. Whether there were any repayments during the years, I don't know.

When I excluded, in my final exhibits, these loans from the trustee of the pension fund, I took into consideration the factor, that the Western Electric Company had had this money borrowed continuously from the trustee of the pension fund. If the company borrows ten million dollars, not on a bond issue, but on its unsecured notes, running for two years, and it invests the money in its [fol. 7358] business, then in figuring this average investment, I would exclude those notes, even though they were two year notes. They represent temporary working capital, not permanent capital. If they were five year notes, whether I would exclude them would depend upon the conditions under which the notes were issued, and would depend upon the purpose for which any rate of return might be shown. If the company borrowed ten million dollars for five years on notes it was going to use in its business generally, when I arrive at the average investment, whether I would exclude the notes depends upon specific conditions. Whether I would exclude it or not would depend upon the circumstances surrounding the individual case. I would exclude a mortgage obligation under certain conditions; under other conditions I would not. You can't generalize about such items.

I excluded the notes payable to the trustee of the pension fund in this case for two reasons. The first is, I do not see any distinction between money borrowed from the trustee of the pension fund and money borrowed from a bank. If you didn't have the trustee of the pension fund to borrow it from, you would have borrowed it from the bank. If I exclude the notes payable to the bank, I should exclude the notes payable to the trustee of the pension fund. The other reason is that the notes payable to the trustee of the pension fund are, in reality, in lieu of a reserve for pension fund.

The years prior to the time the money was with the trustee, it was in the pension fund, and I excluded the pension fund, therefore I also exclude the notes; a change of form.

I believe that as a matter of fact, what the Western Electric Company does, is to borrow large amounts of money from the trustee of the pension fund, and issue its demand notes for them, and then use that money in its business.

One of the reasons why I exclude that, is on the theory that it is a temporary borrowing. That is not the main reason. The main reason is that you should not include in your rate base, as a basis for an eight or ten per cent return, something that is borrowed, and upon which you are only paying 5½ or 4 per cent interest. The effect of it is to give the owners of the business a higher rate base. And they make [fol. 7359] the difference between the rate of return and the rate that they pay on the borrowed money.

The fact that the loan was temporary was one reason why I would not include it in the rate base. The second one, it was analogous to the reserve for pension fund; and the third, is because to include it in the rate base is to make a profit equal to the difference between the rate of return on the rate base and the amount paid to the trustee. The fact that these were demand notes is one of the factors.

I understood that this pension fund money was continuously in the business for a period of years. I considered all the elements, the form of the transaction, and the substance. I did the same with the money borrowed by the Western Electric from the American Telephone and Telegraph Company, where there was no obligation to return it under a year; I took that out because it was temporary. I did not see correspondence between the presidents of the two companies, showing that in 1929 and 1930, the Western Electric had had that money for at least a year. I did not know of the correspondence, but I don't think it would have changed my calculation. That the loans are temporary is one of the factors.

"Q. I have asked you about these two, to try to show you, to try to put to you, that if the loans were in fact not temporary, but for more than a year, would you still have excluded them?

A. If they are of the type of loan that you describe, yes."

Exhibits X-54 and X-55, not like the ones that we have been discussing, are exhibits which I want to be taken as showing what I claim to be the rate of return for the Western. In Exhibit X-54 I excluded certain cash which I claim to be excess cash, and excluded from the profits, interest at the rate of 2.5 per cent per annum. The rate of 2.5 per cent was a composite rate which was compiled from information shown in the report CR-714. I think it covered the period from about 1916 to—up to possibly 1927.

I don't recall if they went for the entire period or not. As a matter of fact, I did not exclude the so-called claimed excess cash in all years.

I don't know whether I could get an average of all of the years for the cash, because I would have to look at my [fol. 7360] working sheet on that to see just how I determined the rate. I recall I only took out cash in certain specific years. The largest amount was taken out in 1925. I don't know it to be a fact that in that year the records which I say I had an opportunity to inspect showed that the Western Electric Company earned on its cash balance 5 per cent. If it is true that the Western Electric earned 5 per cent on its cash balance in 1925, then, when I applied the two and a half per cent, which was an average, to the conditions in 1925, which was one year in which I took out a large amount of claimed excess cash, I penalized the Western Electric to the extent of two and a half per cent on over twenty million dollars, amounting to over half a million dollars. I made an investigation before I determined this adjustment. My working sheets show what I did on it.

What was just said with respect to this claimed excess cash and the use of two and a half per cent is true not only with respect to Exhibit X-54, but X-55, X-57, X-58, X-61, X-63 and X-64.

Exhibit X-99 is based upon an attempt to figure what the American Telephone and Telegraph Company would have earned on the dollars invested by it in the Western Electric Company without respect to the earnings of the company left in the business. Included in that exhibit, as a special item, is a special dividend paid by the Western Electric to its stockholders in the year 1927, which is treated as a receipt for the year 1927. It is set forth as a special item. I do not want to give the court the impression that the item is included with another item in the year 1927. It is set forth specially, but it is set forth in the year 1927, and shown as 88.32 per cent earning for that one thing. It includes earnings made by the International Western Electric Company and its subsidiaries and its predecessors in the foreign field from 1881 to 1927.

In Exhibit X-94 I show a number of adjustments to the 88 companies set forth in Gregory Exhibit A-85. Some of those adjustments are plus, and some are minus. I have not made any effort to find out what the effect would be

upon the return shown in Exhibit A-85 for these 88 companies if I gave effect to all of these adjustments.

I think it is self-evident from the exhibit that if you make adjustments aggregating twenty-five million dollars in one [fol. 7361] year, on one company, that that would have some effect on the rate of return shown for that company. And if you made the adjustment another way on another company, it would have some effect. These adjustments are not all one way. It is an easy, but a rather long job for an accountant to take these adjustments and find out how much effect it would have upon the figures appearing in Gregory Exhibit 85-A.

"Q. Yes. And as a matter of fact, it would just make a difference of three-tenths of one per cent; I put it to you whether you want to investigate that or not.

A. Well, that, of course, is subject to my counsel."

In Exhibit X-90 I make a comparison of the total operating and non-operating results of the Western Electric Company as shown in Poor's Manual, with the operating results of the Western Electric as shown on Exhibits A-77 and A-79. In making this comparison, the investment figures taken from Poor's Manual are, I believe, after reductions for notes payable. It is probably correct that no corresponding reduction was made in the profits on account of interest with respect to such notes. The figures which I use here, taken from Exhibits A-77 and A-79 have not been so reduced.

"Q. Now, what you have got here is a comparison on a basis that is wholly incomparable, haven't you?

A. I have a comparison which shows that if the Western Electric Company had been set up on the same basis as the 88 companies, the result would be entirely different."

When the plaintiff made its comparison in Exhibit A-85 between the Western and 88 companies, it was made on the basis that was testified to by Mr. Gregory.

I have compared the earnings of the Western on the one hand with the notes payable out, and with no reduction on account of interest attributable to those notes; and on the other hand, I have compared it with those notes in.

The purpose of the exhibit is to show that there is not any relation between the two, not to compare them. I have no knowledge at all as to the life in service, salvage, or any

other factor affecting the depreciation rates of the Western Electric Company on its machinery. I did not say yesterday that I had excluded from its expenses the two million dollars which the Western accrued in 1928, because I found [fol. 7362] that the average rate on machinery of these 88 companies was seven and a half per cent. I said that my understanding was that the Western Electric used a rate of 7½ per cent. And I said that my examination of the eighty-eight companies disclosed the fact that a great many of the companies—you understand, of course, all of the companies do not disclose their depreciation policy—but most of them that disclose it had rates below 7½ per cent.

I know as an accountant that each company, if it sets up its depreciation rates properly, reflects its own particular experience, except to the extent that it does use the experience of companies in similar lines of business as a guide. A particular manufacturing company can have an experience with respect to depreciation that is identical with another manufacturing company if they are in the same line of business. If the Western Electric Company makes central office equipment, and Stromberg-Carlson makes central office equipment, the depreciation rate of the two companies on machinery is not bound to be identical. Each company adopts its own basis but it is very likely the rate should be somewhat similar. All I said about the rates for the Western Electric was the fact that their rates in the main, are higher than other companies. I express no opinion as to the propriety of the Western Electric's rates. I have excluded two million dollars from the expenses of Western Electric in the period 1923 to 1930 because, in 1928, they changed their rates from 7½ to 10 per cent and made it retroactive for four years.

I have my own opinion as to whether 10% was a proper rate. The opinion is not based on nothing; it is based on rates in use by other manufacturing companies and not on the Western's experience at all. I have not been in any of the Western Electric Company's manufacturing establishments.

I have used the term "Excessive depreciation." That merely connotes the difference between the dollars resulting from the rates actually used by the Western Electric, and such sums as have been allowed up to date by the Government to the Western for the expense of depreciation in its income tax returns.

The term "excessive depreciation" is merely to distin-
[fol. 7363] guish it from "extraordinary depreciation" and to note the difference between the Western's rates and those allowed by the Government for income tax purposes.

Exhibit X-69 is an attempt to show the earnings of the International Western on the dollars originally invested in its business by the Western Electric Company, whereas X-67 is an attempt to show the earnings of the Western on its original dollar investment in the International. I think the exhibits speak for themselves. In column 3 of this exhibit, underneath "earnings" there appears the sum of $3,458,000, with a note to it. I don't know whether or not this figure includes a special dividend from the Western Electric Company, Limited, of Canada, of $3,028,000. I do know that there was a dividend income included in that year. I am not familiar with the names of the companies from whom the dividends were received. I merely know there is dividend income in that year. I don't know whether that represents earnings of a subsidiary of the International Western Electric Company, not only during this period 1918 to 1924, in this particular case, but long prior thereto. I have included this, and I have no knowledge as to what the fact is, as to whether the earnings represented by that dividend were made in a period long prior to this. In considering the rate of return, I have treated it as of this particular year. I have included in the Western Electric Company's average investment shown on this exhibit only its stock investment. If I had added loans made by it to the International Western Electric, and then increased its net earnings, by the amount of the interest, whether the result would have been a much lower rate of return would depend upon whatever the facts show. I have not made the calculation.

If the rate of return paid on these loans was less than the rate of return shown by this statement, it would reflect the result. I don't know whether it was lower or not. I did not say that they paid an average rate of interest as high as 18 per cent. I said I didn't know what effect it would have. If the rate of interest paid on these loans was less than 6 per cent, then the inclusion of these loans, if materially large, as a part of the investment, and adjusting the earnings for the interest would result in materially reducing the
[fol. 7364] calculation which I have shown in this exhibit.

In Exhibit X-82, I have assumed a 10 per cent return

on the average investment of the Western Electric Company as shown in Mr. Gregory's exhibits and have proceeded to arrive at the per cent return on this assumed basis, first, on the average capital stock, and second, on average capital stock and surplus applicable to operation. I don't know the operating earnings of the Western Electric Company in this period or whether they were 8½ per cent instead of 10. The purpose of this statement is not to tie them up with the actual earnings at all. I don't know what the computation is as to the extent that the computed returns are higher than the actual. For the year 1930, I show a 10 per cent return of $28,935,000. The actual earnings for that year, as shown on the Gregory exhibit, were $12,934,000 or about 4½ per cent of the total business; so what I am really doing here is to assume 10 per cent return that the Western said was the proper return on its business, and set it up in this exhibit to show what the result would be if that return had been realized, although it was not in fact realized.

June 9, 1932.

I have referred to the provisions of a preferred stock certificate of the Graybar Electric Company, which gave to the Western Electric as the holder of preferred stock of Graybar a certain participation in net earnings. Net earnings is defined in the certificate itself. (Counsel reads from said certificate as follows):

"The term 'net earnings' as used in Sub-Division 1 of Sub-Paragraph A, shall be deemed to mean, net earnings as determined under the corporation's established accounting methods, and after the deduction of the following items:

A. All taxes except United States Income Taxes.

B. Payments into the Pension Fund of the corporation, covering the current accrued liability, pursuant to the provisions of the corporation's plan for employes' pensions, disability benefits, and death benefits, but excluding payments to make up deficiencies in said Pension Fund.

[fol. 7365] C. Cumulative dividends upon preferred stock.

D. The sum of $450,000 for each year."

The following exhibits which have been identified during the course of my examination are based on the stockholders' original investment, without regard to undistributed earn-

ings left in the business; X-67 relating to the International Western Electric; X-69, International Western; X-72, the top block of that exhibit relating to Graybar; X-79 relating to Electrical Research Products in so far as it affects the first computation, there are two computations, one is on the basis of the original investment, and the other gives effect to the accumulation of earnings; X-82, one column is Capital Stock, and the other is Capital Stock and Surplus; X-81, Northern Electric, which is based on the original investment.

In Exhibits X-86, X-87 and X-88 I have made an adjustment of $2,000,000 on account of the sale of certain property by the Western Electric to the Bell Telephone Laboratories in the year 1925.

In Exhibits X-83 to X-88 I have included in the profits of the Western Electric Company as adjusted, either in whole or in part, the profit resulting from the sale of the International Western Electric, which I have heretofore discussed.

The exhibits are not all comparable as to the question of net profits. Exhibits 83, 84 and 85 are on one basis, and 86, 87 and 88 are on a different basis.

Exhibit X-84 is "Consolidated average investment, profits and per cent of return of Western Electric Company and its subsidiaries." In the year 1930 I bring the Teletype into this consolidated statement. I brought in the same companies that the Western Electric Company itself brought in, in making up its consolidated statement. If the Teletype is in Mr. Gegory's figures, it is in these figures. I arrived at the average investment here, by taking the average investment at the beginning and the end of the year, and dividing it. The Western Electric Co. purchased Teletype for approximately $30,000,000. There is an item of $23,000,000 appearing on the books of Teletype for good will. I believe that I excluded that item in this exhibit. The net result of that was that I have reduced the investment appearing in this consolidated return by one-half of [fol. 7366] $23,000,000 for the year 1930. I did that because there is an item of good will appearing on the Teletype books, although Western paid $30,000,000 in cash for Teletype. I gave the same treatment to this Teletype situation as I have described in Exhibit X-84, also in Exhibits X-85, X-87 and X-88.

Redirect examination.

By Mr. Goldstein:

Referring to a question on cross-examination relative to the $1,400,000 Graybar Pension Fund, provided for in the year 1928, as to whether or not it was included in non-Bell operating expenses, I have made an investigation since yesterday to find the fact. I find that in Exhibit D-19, which has been previously introduced, the item of $1,400,000 appears in the column "Additions to Employes' Benefit Fund," under the general caption, "Non-Bell Customers," in the year 1925, as a charge against the Non-Bell operations of that year. There is a footnote in D-19 which states specifically that the additional liability for Pension Fund which is charged as a non-Bell operating expense, has reference to this particular $1,400,000. The footnote reads, "Include $1,400,000 reserve for Graybar Electric Company, Inc., Pension Fund."

I was asked about my change in the method of making the allocation of the Pension Fund accruals prior to and subsequent to 1925. I have investigated my records and I find that when I made the allocation I had before me a copy of Exhibit D-19, entitled, "Western Electric, Inc., Analysis of Cost of Sales by Bell and non-Bell Customers." It covers the years 1916 to 1930, inclusive. That was furnished by the Western Electric.

I found that in the years prior to 1925, there was no direct allocation made by Mr. Gregory of the amount added to Employes' Benefit Fund, whereas for the years 1925 to 1928, there appears in the column "Additions to Employes' Benefit Fund" amounts representing the amount allocated both to Bell and non-Bell customers in those specific years.

With reference to pension fund liability taken up as part of the shop cost in the year 1916 to 1925, D-19 shows nothing, but Exhibit D-72 indicates that the Pension Fund liability was taken up as a part of the shop cost, and was there-
[fol. 7367] fore on Mr. Gregory's basis distributed on the shop cost of sales.

This shop cost of sales is included on this Exhibit D-19 in one column, and that was the basis used by me in allocating the Pension Fund adjustments in the years 1916 to 1924. That is, I follow the shop cost of sales, because for that period it indicated that they were included in shop cost of

sales, and shop cost of sales was distributed between non Bell and Bell on the basis of cost of sales.

On cross-examination I was asked what annual reports I had in mind when I testified on direct examination as to the reason why I made the allocation of profit in 1925, on the sale of the International Western, to the period from 1918 to 1925. I have made an investigation as to those records and found that the annual reports which I had in mind were the annual report for the year 1914, the second page beginning with the paragraph, "It will be impossible," and the annual report for the year 1917, the paragraph beginning at the bottom of page 1 and ending on page 2, and the annual report for the year 1918, the comments in the president's letter under the heading of "Foreign," and the annual report for the year 1919, the comments in the president's letter under the heading of "Foreign." Also in the report for the year 1917 it states that there was no return on foreign investments. The profits prior to 1918 were capitalized in the $7,500,000 investment set up in 1918, and my contention is that the profits from 1881 to 1918 were either taken out by the Western Electric Company as dividends during that period, or capitalized in the investment of $7,500,000 set up in 1918.

(Motion to strike what witness' contention is. No ruling.)

The $7,500,000 had to come from some place.

We do not have any different practice in our firm as to certifying statements than the practice of other accountants generally. In the instant case I was not given free access to all of the books, records, files and contracts without restrictions. When we first began our work we were informed that all of the information that we required in connection with the exhibits, which we were to check, was contained in certain data which was made available to us by Mr. Gregory, that is, the working papers. In some cases [fol. 7368] there were things that I wanted, and called for, that I did not get.

I had a conversation with Mr. Gregory with reference to access to the records, and the procedure which was to be followed with reference to getting information. I do not recall the identical conversation, but the substance of it was to the effect that any records of the company that we desired, or books, we would have to ask for, and in most

cases we were requested to put them in writing, and after putting them in writing, and submitting them to Mr. Gregory's office, we were frequently told that the request would have to be submitted to counsel before we could be given an answer.

In request No. 11-B, I asked permission to examine the Journal with reference to the Journal entries pertaining to extraordinary depreciation for the years 1924, 1925, 1926 and 1927.

"Q. And were you given permission to make the examination?

Mr. Thompson: Those are the Journal entries—pardon me. Those were the Journal entries that you introduced in one of your exhibits here in court?

Mr. Goldstein: He was furnished them; he was not given permission to examine anything."

I made requests for documents from the Western Electric Company. My conversation was usually with Mr. Gregory.

In apportioning the reserve for depreciation between Bell and non-Bell business, about which I was asked on cross-examination, I used the plant apportionment as calculated by Mr. Gregory. The apportionment of the depreciation reserve in connection with the exhibit in which I used the plant apportionment, was solely to give effect to the apportionment of the adjustment for depreciation reserve.

(Counsel agree that "Erpi" means Electrical Research Products, Inc.)

"Q. You were asked yesterday about the Erpi Foreign Investment. Did that Foreign Investment come from the earnings of the Electrical Research Products, or the original investment of the Western Electric Company?

A. Yes."

[fol. 7369] Since cross-examination I made an investigation as to the basis upon which the Pension Fund accruals were built up as used in Exhibits A-77 and A-79. I found that the Pension Fund accruals as used in Exhibit A-77 and A-79 were built up of a charge against operation of the total required accruals, excepting a limited rate of income represented by the interest paid to the trustee of the Pension Fund.

(Counsel for city states that they are not passing on what is or is not required nor on any actuarial question.)

I am merely stating that the total additions to the Pension Fund in those particular years represent the amount which the Western Electric appropriated, plus the amount of 5.5 per cent interest, or whatever rate was paid to the trustee of the Pension Fund. If the Pension Fund should earn more interest, than the rate of interest computed as a basis for the accrual charges, the accrual charges to operating earnings would be reduced to a corresponding amount.

When I was asked on cross-examination if the $48,000,000 dividend came from non-Bell business from 1881, and I answered "Yes," I had in mind Exhibit D-61, which showed such a possible source, and did not have any other facts upon which I could base a conclusion as to the source of this dividend, as the data supporting Exhibit D-61 were refused me.

Exhibits X-55 and X-88 give the final conclusion of all the adjustments on Bell and non-Bell business, and on the company as a whole, both as to the rate base and as to profit.

"Judge Wilkerson: Now, about this matter of inspection; this matter of the inspection of books has come up right along here in this case. As I have said before, the court does not propose to have this case go off and come back here again on any question of the inspection or production of books. Hard as it may be in the hot weather, if necessary we will stick with this thing until every reasonable requirement has been complied with. If counsel will bring the matter to our attention, and have a specific complaint about what it is that they wanted to see, and could not see; or if there are any documents in here that represent—a summary of the books, why, of course, they are entitled to [fol. 7370] see the books. Now, there has been a large number of indefinite complaints made here, and I do not know for what purpose—whether it is to base an argument upon, that after all, this case will have to come back here again, and be heard over, because the court had made a mistake in not compelling the inspection or production of books. Now, we do not intend to have this case go off in that way.—And I will say that if it takes all summer we will stay here to make a record on that; but we expect to have our attention

called to specific things about which complaint is made. * * * I think this: I think either the matter should be brought before the court in some concrete way, in which the court is invited to rule with reference to specific books, as to which access has been denied, or the leveling of these general accusations should stop in this case.

Mr. Goldstein: Just as bearing upon the question of the state of the record, there are two angles to the question of the refusal. One is, if the information is part of the case of the plaintiff, we have a right to show the refusal to give us access, not for the purpose of having the case reversed, because it is not there, but as bearing upon the question as to whether they have made the proper proof in a case where they must show confiscation.

But if the facts are not in the record, and the question is, shall the court take judicial notice of certain practices in their own experience, and they say because—their witnesses testify that "because of our experience over a period of years, we find that so and so," and we show that we tried to get at specific facts, and they have refused them, in our opinion that has a bearing as to whether or not they have—their testimony of the general practice should be accepted."

Recross-examination.

By Mr. Thompson:

I started my work of examining the records of the Western Electric Company in this case about the last week of December, 1931. I have had three assistants at times; most of the time I have had two. Mr. Whitworth, one of the Chicago partners of Touche, Niven & Co. has also been engaged in the case. We keep a record of the day's work that we have spent.

(Counsel for Plaintiff asks for said time record and defendants' counsel agrees to furnish it.)

I was here part of the time when Mr. Gregory testified; not all of the time. I have not examined pages 4, 5, 6, 7 [fol. 7371] and 8 of Exhibit A-73 introduced by the plaintiff in this case and which purports to show statements submitted directly to Touche, Niven & Company, from December 29, 1931 to February 26, 1932, in New York; then submitted to Touche, Niven & Company January 18, 1932 to March 9, 1932, at the Hawthorne Works, to find

out whether that is a correct statement of information which had been furnished to us up to the date these sheets bear. I will find out whether that is correct or not.

I do not know whether it is a fact that the Western Electric Company brought into this court room at the time Mr. Gregory was on the stand, five ledgers of the Western Electric Company, 16 journals and 29 cash books, or a total of 50 books of the Western, and all of the other books that are listed, all of the other records of its subsidiary corporations that are listed on A-74, together with 102 folders of work papers. After the first hearing in this case, the books were taken back to New York and at my request records were held in New York for three or four days before they were sent back here, because we were engaged in an examination of the underlying data that had been used in Mr. Gregory's exhibits. I do not know how many records or whether all of them were held there.

I believe plaintiff was called up in Chicago and told that it would be a great accommodation to us if those records could be held in New York. However, I did not call you. I had an office at 195 Broadway. I think we occupied it during the months of January and February, and again for about two or two and a half weeks in April. That was furnished by the Western Electric Company. We used it for the purpose of examining the Western Electric books and records there. They prepared a lot of statements in response to requests. I did not ask them to prepare statements. In some cases I asked them for certain things and they of their own volition supplied the statements.

When the question arose out here as to a reconciliation of shop variations and other adjustments, I believe that Mr. Hagberg and the accountants of the Western Electric Company worked together. He was furnished with an office at the Illinois Bell Telephone Company. I cannot say many of his assistants worked there or for what period of time, because I was not present. I went over there to the build-
[fol. 7372] ing once or twice and spent about a half an hour. I believe that a large amount of records and work sheets and data were made available to Mr. Hagberg over there.

I cannot say offhand how many days we occupied the office in New York. Our men were there week in and week out. I don't know how many days our forces occupied quarters of the Illinois Bell Telephone Company, because I was in New York a good part of the time.

"Mr. Thompson: I call your Honor's attention to the fact that Mr. Gregory, when his exhibits were offered in evidence, had in court, and the record so shows, all of the books and records of the Western Electric Company and its subsidiaries referred to in Exhibit A-74, and also 102 binders containing his working papers, and that no objection was made to the introduction in evidence of those exhibits on the ground that any information had been denied to the defendants."

R. C. RAINWATER, called as a witness on behalf of the defendants, having been first duly sworn, testified as follows:

Direct examination.

By Mr. Goldstein:

June 10, 1932.

My name is R. C. Rainwater, I reside at Wheaton, Illinois, I am a licensed public accountant, occupying the position of Examiner of Accounts for the Illinois Commerce Commission. I have occupied that position about 11 years. Three years before coming to the employment of the Illinois Commerce Commission, I was accountant for the Southern Illinois Light & Power Company, an Illinois corporation operating public utilities in this State.

As Examiner of Accounts for the Illinois Commerce Commission I examine the accounts, books and records of the various Public Utilities under the jurisdiction of the Illinois Commerce Commission, upon direction by the Commisson to make such investigation whenever the Commission consider it necessary, and prepare reports based thereon. I [fol. 7373] have been actively engaged in the preparation of the present case on behalf of the Illinois Commerce Commission.

"Mr. Goldstein: I offer in evidence Defendants' Exhibit X-103, entitled 'A. T. & T. Co. (excluding long lines)—Analysis of the Estimated Costs of (1) Carrying investment in the physical property used in rendering license contract services, (2) Holding funds available during period to meet cash requirements of licensee companies and (3) Temporary financing of the licensee companies,' for the period 1919 to 1931.

Also, X-104, entitled 'A. T. & T. Co.—Statement of total revenues and expenses, showing separately (1) Long Lines Department Operations, (2) License Contract Operations, and (3) Holding Company Operations, Schedule 3001 of Report to the Interstate Commerce Commission,' for the period 1920 to 1931. These sheets were sent by the American Telephone & Telegraph Company to the defendants. The sheets 1923 to 1930 are at the offices of the Illinois Bell Telephone Company, and I would ask that they be produced, that they produce them and attach them as a part of this exhibit.

Also, Exhibit X-105, entitled 'A. T. & T. Co.—Statement of average assets, showing separately, (1) Long Lines Department Operations, (2) License Contract Operations, and (3) Holding Company Operations, Schedule 200-A of Report to the Interstate Commerce Commission,' for the years 1920 to 1931. The sheets for the years 1923 to 1930, inclusive, are at the offices of the Illinois Bell Telephone Company, and we will have them produced, and attached as a part of this Exhibit.

Also, Exhibit X106, a document prepared by the American Telephone & Telegraph Company, entitled 'A. T. & T. Co.—Allocation of Taxes, 1923-1930,—Heiss Exhibit No. 10. Analysis of Taxes 1920-1930,' consisting of three sheets, and being an analysis of taxes for each year 1920 to 1930, inclusive.

Also, Exhibit X-107, a statement furnished by the American Telephone & Telegraph Company, entitled 'A. T. & T. Co.—Instrument Maintenance, Years 1923-1927—Heiss Exhibit No. 10,' the corresponding sheets for the period 1920 to 1922 being at the offices of the Illinois Bell Telephone Company, to be attached as a part of this Exhibit."

The Witness (continues): Exhibit X-108, entitled "A. T. [fol. 7374] & T. Co.—Average Cost of Funds used in Business" for each of the years 1920 to 1930, inclusive, was prepared by me or under my direction.

All of the figures shown in X-108 were furnished by the Company excepting those in the column marked "Per Cent" and the figures in the line marked "Total" immediately preceding the line marked "Grand Total."

The figures in the "Per Cent" column were computed by me and represent the per cent of the various items of sources of funds to the "Grand Total" of funds used in the particular year in the business.

The second "Per Cent" column contains the per cents of the various items of dividends, interest and amortization charges to the "Grand Total" of such charges during each of the years.

The line "Total" immediately preceding "Grand Total" represents the sum of the items designated as "Funded Debt," "Loans from Associated Companies, Loans from Bankers and Notes Payable to Pension Fund Trustees," during each of the years 1920 to 1930, inclusive, and the per cent that the total of these items bears to the "Grand Total."

Exhibit X-109, entitled "A. T. & T. Co.—Computation of Annual Cost of Furnishing Telephone Instruments to Chicago Division of Illinois Bell Telephone Company, Year Ended December 31, 1923,"—was prepared by me or under my direction.

The figure under "Totals all Licensees"—10,030,484—was computed from a sheet entitled "Average Number of Stations in service for each company receiving the license contract services, years 1923 to 1930, inclusive."

The figure 660,927 was also taken from the same sheet furnished by plaintiff.

The third line, "Per Cent Chicago Division"—6.589 per cent—is a mathematical calculation of the relation of 660,927 to 10,030,484.

The figure $31,329,013, representing the American Telephone & Telegraph Company's average investment in telephone instruments, was taken from X-103; and the amount of $2,064,269 represents the Chicago proportion, using the percentage shown above.

The average depreciation reserve, $14,971,542, was com- [fol. 7375] puted from D-100 and computed on the basis of the average of the balances for the beginning and ending of each year. The portion of depreciation reserve shown in the last column under Illinois Bell—Chicago Division—is the result of applying the percentage 6.589.

The average investment in telephone instruments, less average depreciation reserve, $16,357,471, for all licensees, and $1,077,794 for Illinois Bell Telephone Company—Chicago Division—represents the average investment computed in the manner already described, less the average depreciation reserve also computed in the manner described. This is the same basis of determining the investment in

telephone instruments as used by Mr. Heiss in Exhibit A-166.

The figure $74,044 represents the return on the average investment in telephone instruments less depreciation reserve at the same rate which Mr. Heiss calculated to be the annual cost of the funds for the year 1923, shown in X-108, and which is also used by him in A-166.

Repairs $1,086,422 was taken from X-107, and $71,584 is the portion thereof allocable to Chicago division.

Depreciation Expense $2,133,172 was taken from X-107 and the portion allocable to the Chicago Division is shown in the last column.

Taxes, $54,720, was taken from the books of the Illinois Bell Telephone Company.

Insurance and Contingencies, $21,556, is an amount which has been added to correspond to the estimate which the company used in its set-up of estimated annual charges for the year 1923 at the former hearing, as shown in Rec., Vol. 3, p. 1038.

This Exhibit X-109 shows in the last line that the annual cost of furnishing instruments for the year 1923 was $362,459, which includes all the expenses, such as depreciation, maintenance, taxes, insurance and contingencies, and provides a return on investment equal to the annual cost of funds to the American Telephone & Telegraph Company during the year 1923—such cost of funds being the amount which the American Telephone & Telegraph Company has represented to be the annual amount paid by it currently on funds used in its business which were derived from its funded and other indebtedness and from its capital and [fol. 7376] surplus, and includes dividends paid by the American Telephone & Telegraph Company at the rate of 9 per cent.

Exhibit X-110, entitled "Illinois Bell Telephone Co.—Chicago Division—Comparison of Company's Tabulation, Record, Vol. III, 1038, of Annual Cost of Furnishing Telephone Instruments with Commission Accountants' Computation, as per sheet attached, of Annual Cost of Furnishing Telephone Instruments for the year ended December 31, 1923," was prepared by me, or under my direction.

The figures shown in the first column entitled "Company's tabulation (Rec., Vol. III, p. 1038)," amounting to $709,007, were taken from the Company's tabulation offered at the former hearing in 1929, being the annual cost of tele-

phone instruments if the Illinois Bell had owned the instruments in that year.

The first column represents the showing by the Illinois Bell at the former hearing of what the annual cost would be on the basis of the Illinois Bell purchasing the telephone instruments in the year 1923. The figures shown in the second column, entitled "Commission Accountants' Computation, as per X-109," represent a reproduction of the annual cost as shown in X-109. They are the same figures as were shown in the preceding exhibit. The figures in the third and fourth columns represent the amount and per cent of excess of Company's tabulation over Commission Accountants' Computation.

Exhibit X-110 shows that the Company's tabulation used for the average investment in telephone instruments in the Chicago area was $3,494,271; that the American Telephone & Telegraph Company's actual investment, as shown in the Commission Accountants' computation per X-109 for these same telephone instruments was $2,064,269; and that the Company's tabulation of what the investment would have been if the Illinois Bell were the owner of the instruments purchased in that year of them exceeded the American Telephone & Telegraph Company's actual investment in such instruments by $1,430,002 or 69.27 per cent excess.

The figures in the first line are on the basis of comparison of undepreciated investment on the books of the American Telephone & Telegraph Company, in the second column, [fol. 7377] with the Illinois Bell's presentation of the cost —what the cost would have been if purchased in the open market, that is before depreciation.

The second line shows that the Company's tabulation in 1923 did not include any depreciation for the telephone instruments at all but considered that the instruments which would be in use in that year would be new instruments purchased in the open market.

The amount of $986,475 is the portion of the depreciation reserve shown on the books of the American Telephone & Telegraph Company, allocable to its investment in telephone instruments in that year in use in Chicago, making a net investment of $1,077,794, as compared with the Company's tabulation of $3,494,271. When I say "Company's tabulation," I mean the Company's tabulation of what the investment would have been on the basis of its purchase,—

that is $3,494,271 as per the company's tabulations as compared to the American Telephone & Telegraph Company's investment after depreciation reserve of $1,077,794.

The Company's investment figure is $2,416,477 in excess of the American Telephone & Telegraph net investment, or an increase of 224.21 per cent, all as shown in the third line. The figure $279,542 represents the number of dollars resulting from the Company's calculation of 8 per cent return on investment.

The figure $74,044 is the return on investment to the American Telephone & Telegraph Company based upon the annual cost of funds of 6.87 per cent, as shown in X-108. The amount of $205,498 represents the excess of the return on investment as computed by the Company's tabulation at the 1929 hearings over the return on investment to the American Telephone & Telegraph Company based upon its annual cost of funds, or an excess of 277.53 per cent.

The figures for repairs, depreciation, taxes, insurance and contingencies shown under heading "Excess of Company's Tabulation over Commission Accountants' Computation" represent the subtraction of column 2 from column 1 and the per cent of excess of column 1 over column 2.

The line "Total Annual Cost of Furnishing Telephone Instruments," shows that on the Company's Tabulation at the 1929 hearings the annual cost is computed at $709,007, and the computation made on the basis of the actual invest- [fol. 7378] ment of American Telephone & Telegraph Company in telephone instruments, results in an annual cost of $362,469, including therein a return on investment at the rate of the annual cost of funds, which would produce an excess annual cost for the year of $346,548, or 95.61 per cent in excess of the cost shown in X-109. That is, $709,007 which the Illinois Bell at the former hearing said would be the annual cost if it were the owner of the instruments, compares with $362,459 which was the actual annual cost to the American Telephone & Telegraph Company for those instruments in that year based upon a return to it of 6.87 per cent, enough to take care of its carrying charges, and the 9 per cent dividend allocable to that investment—and left an excess of $346,548.

The figures designated as "Average Cost of Furnishing Instruments per Telephone Station in Service" are the annual costs expressed in dollars per station, showing $1.07 per company's tabulation in 1929, 55 cents per tabula-

tion in X-109, and resulting in an excess, on the Company's tabulation, of 52 cents per station. That is the Company's presentation in 1929 was $1.07 per station, and the American Telephone & Telegraph Company's actual experience was 55 cents per station.

The figures opposite the line "Average Investment in Telephone Instruments per Telephone Station in Service" show that on the Company's tabulation the average investment per station was $5.29, before depreciation, and the tabulation in X-109 shows the investment to be $3.12, resulting in an excess of the Company's computation of $2.17 per station.

On the basis of the American Telephone & Telegraph Company's actual investment less depreciation reserve, the figure is $1.63 per station. The Company's tabulation shows an excess investment of $3.66 per station. That is, the Company's figures in 1929 used as a basis an investment of $5.29 per station, and the American Telephone & Telegraph Company's actual investment was $1.63 per station.

Exhibit X-111, is entitled "A. T. & T. Co.—Amount of Return on Investment in Telephone Instruments shown by Company's tabulation—Rec., 1038—related to amount of investment in telephone instruments shown by Commission Accountants' computation during year ended December 31, 1923."

[fol. 7379] Item 1, "Average Investment in Telephone Instruments less depreciation," amount of $1,077,794 was taken from X-110. Item 2, "Return on Average Investment at Rate of Cost of Funds," 6.87 per cent, was taken from X-110.

Item 3, "Additional Profit to American Telephone & Telegraph Company for corporate surplus," was taken from X-110, and represents the excess of the return on the basis of the Company's tabulation in 1929, over the cost shown in X-109.

Item 4 is the total of Items 2 and 3 and shows that the total return to the American Telephone & Telegraph Company on its net investment resulting from the Company's tabulation of annual cost of $709,007 would be $420,592, which is 39.02 per cent on what its net investment was in the year 1923.

Item 6 shows that the figure of 39.02 per cent on its investment in telephone instruments results in a return to the American Telephone & Telegraph Company's stockholders

on their proportionate stock investment of 59.53 per cent after taking care of interest on funded debt, and amortization charges.

In the M. R. reports 1, 22-A, 22-B, C. R. 51-A, 53, 67, 67-B, 76 and 97, in Provisional Estimate Statement E, in Annual Report to Stockholders of the American Telephone & Telegraph Company and in Bell Telephone Securities Manuals used by the American Telephone & Telegraph Company, I found a showing of return on capital stock similar to the return that I have expressed in the percentage 59.53.

In Exhibit X-112, entitled "A. T. & T. Co.—Per Cent of Return on Investment in Telephone Instruments used by the Illinois Bell Telephone Company, Chicago Division, per Exhibit A-200"—that is Plaintiff's Exhibit A-200 in this hearing—"Fair Allowance for Telephone Instruments in Chicago Division (Exhibit A-163), Less Costs already included during Years 1923 to 1927, inclusive (Costs shown in Exhibit A-170)." Item 1, under "Net Investment in Telephone Instruments, American Telephone & Telegraph Company," was taken from Plaintiff's Exhibit A-166.

Item 2, "Investment Allocated to Long Lines" was computed from A-166, using the percentages shown therein.
[fol. 7380] Item 3, "Investment of Associated Companies" represents Item 1 minus Item 2.

Item 4, "Investment Allocated to Chicago Division," was computed from A-166 on the basis of percentages therein.

Item 5, "Return on Investment, Chicago Division," was taken from A-166 and is the return on investment at the rate of annual cost of funds to the American Telephone & Telegraph Company, which rate is shown on Line 6, and includes the payment of a dividend of $9 per share on the capital stock after taking care of interest and amortization charges.

Item 6—"Per cent of Return on Investment, Chicago Division," is at the annual rate of cost of funds taken from A-166.

Item 7 is the amount of dollars of additional return in excess of the return equal to the annual cost of funds which is included in the amount of fair allowance on telephone instruments in A-200, as claimed by Mr. Heiss.

Item 8 is the per cent of additional return on investment represented by additional return shown in line 7.

Item 9 shows the total number of dollars return included

in the computations in A-200 of fair allowance on telephone instruments.

Line 10 shows that the amount of return included as part of the fair allowance on telephone instruments by Mr. Heiss, results in a return in the year 1923 on the net investment of the American Telephone & Telegraph Company of 20.40 per cent; in the year 1924, 20.80 per cent; in the year 1925, 20.20 per cent; in the year 1926, 18.34 per cent; and in the year 1927, 17.31 per cent.

I will explain what I mean by the words in Item 7; "Additional Return on Investment." Exhibit A-200, Item D, Line 2, refers to fair allowance for telephone instruments in the Chicago Area, Exhibit A-163, less costs already included in Item B above. For the year 1923 that amount is $145,625. This figure is from the exhibit offered by Mr. Heiss, designated as A-200. Now in another exhibit that Mr. Heiss offered, Exhibit A-163, he computed the cost of furnishing the telephone instruments. The "Investment" referred to in Exhibit X-112 is the allocated proportion of book investment of the American Telephone & Telegraph Company, less the average depreciation reserve shown on its books.

[fol. 7381] "Judge Wilkerson: Why do you call it a return?

Mr. Goldstein: I will explain it, if your Honor please. When Mr. Heiss was on the witness stand, if your Honor will recall, I asked Mr. Heiss this question:

'If you add $145,000 in that column, Fair Allowance to the amount you already show in A-163, which itself included a return on the investment of 6.87, how much would the entire amount be, available for return on the investment in telephone instruments?'

And he said: 'I could not figure it out mathematically.'

Judge Wilkerson: And so you have had it figured out.

Mr. Goldstein: We have had it figured out.

Mr. Blackman: So that your Honor may understand the whole thing, Mr. Heiss proceeded to build up his costs, which he said was the actual cost of the operations on the license contract. In that, he found that the instruments had cost so much, and that there had been so much of reserve set aside. He deducted the reserve from the original cost, and he said, the American Telephone & Telegraph Company has that much investment today in those instruments, or it did in 1923 to 1927.

Then he took a rate of the cost of money, and he applied it to that balance of investment. Now, he says that is what it cost the American Telephone & Telegraph Company, as a minimum, or any principle. But, he says, if we are determining whether that is a fair contract or not, on any basis, the American Telephone & Telegraph Company would be entitled to charge for those instruments precisely what the Illinois Bell did.

Judge Wilkerson: The term 'return' does not refer to any actual return.

Mr. Blackman: No, and it is very misleading.

Judge Wilkerson: And the term "investment" refers to no actual investment.

Mr. Blackman: That is correct.

Judge Wilkerson: You mean, then, this is an exhibit which you propose to use, when you come to discuss Mr. Heiss' testimony?

Mr. Goldstein: That is correct.

Judge Wilkerson: All right.

[fol. 7382] Mr. Goldstein: That is correct, to show what it would lead to."

Statement by Mr. Goldstein:

"Exhibit X-113, entitled 'A. T. & T. Co.—Percent of return on investment in telephone instruments used by Illinois Bell Telephone Company, Chicago Division, if total return is reduced by amount of taxes on instruments during years 1923 to 1927 inclusive' is the same as X-112, but gives credit for taxes for which the American Telephone & Telegraph Company reimbursed the Illinois Bell, and which Mr. Heiss did not put in, in his exhibit, either by oversight or otherwise, and reduces the amount of that return by that amount."

(Witness continues:) Exhibit X-114 entitled "A. T. & T. Co.—Percent of return on investment in telephone instruments used by Associated Companies, per Exhibit A-198, 'Fair Allowance for Telephone Instruments, Exhibit A-202 less costs shown in Exhibit A-170,' years 1923-7" was prepared in exactly the same manner as X-112 excepting that it covers the return to the American Telephone & Telegraph Company on its net investment in telephone instruments held for the Associated Companies, resulting from the fair allowance which Mr. Heiss claimed in Exhibit A-198.

Line 9 shows per cent of total return on telephone instruments investment in Associated Companies (Item 8 divided by Item 3), for the year 1923, 21.17 per cent; for the year 1924, 21.23 per cent; for the year 1925, 21.03 per cent; for the year 1926, 19.27 per cent; and for the year 1927, 17.82 per cent.

Item 7, Exhibit X-112, is called "Additional Return" because in Exhibit A-163, an amount of return had already been allocated at the rate of the cost of funds, amounting to $73,948; so this is an additional return on investment.

The last line merely converts those returns to a return on capital stock.

In Exhibit X-115, entitled "A. T. & T. Co.—Comparison of claims of Plaintiff for return on investment in Telephone Instruments used by Ill. Bell Tel. Co.—Chicago Division—with A. T. & T. Co.'s actual experience for year [fol. 7383] ended December 31, 1923," the figures shown in column A designated as "Presentation during the year 1929, Rec., Volume III, page 1038" were taken from the record page designated at the heading of the column.

"Judge Wilkerson: All you have to do is to have him say he got the figures from the sources stated in the exhibit and that the computations in his opinion are correct. These exhibits seem to be plain and explain exactly where the figures came from."

I think the sources from which the figures in X-115 were taken are all shown on the face of the exhibit, and, in my opinion, the computations are correct.

In Exhibit X-116, entitled "A. T. & T. Co.—Profit of Furnishing Telephone Instruments to Chicago Division, Illinois Bell Telephone Company, on Basis of Annual Allowance of $1.13 per Station made by Public Utilities Commission in Order of December 20, 1920," the figures Average Stations in Service, for all licensee companies, and the total for the Illinois Bell Telephone Company, Chicago Division, were taken from the sheet furnished us by the company, showing the average number of stations in service.

Exhibit X-116 is prepared in a similar manner to X-109, and the sources are the same.

In X-117, entitled "A. T. & T. Co.—Computation of Annual Cost of Furnishing Telephone Instruments to Chica-

go Division of Illinois Bell Telephone Company, Year ended December 31, 1920," the sources for the figures are the figures furnished by the Company, or the Public Utilities Commission order itself. The computations in my opinion are correct.

The sources for Exhibit X-118, entitled "A. T. & T. Co.—Percent of Return on Investment from Furnishing Telephone Instruments to Chicago Division of Illinois Bell Telephone Company on Basis of Annual Allowance of $1.19 per Telephone Station made by Public Utilities Commission in Order of December 20, 1920, during year ended December 31, 1920," are the same as for Exhibit X-117, and in my opinion the computations are correct.

In Exhibit X-119, entitled "A. T. & T. Co.—Percent of Excess of Average Current Cost of Telephone Instruments used by Illinois Bell Telephone Company, Chicago Division, shown by Plaintiff's Exhibit A-163, over Book Cost computed from Plaintiff's Exhibit A-166, during years 1923 to 1927, inclusive," the sources are indicated either [fol. 7384] in the body or in the heading of the exhibit. I think the computations are self-explanatory.

The working papers have been available to the plaintiff at all times.

In Exhibit X-120, entitled "A. T. & T. Co.—Percent of excess of Average Current Cost of Telephone Instruments used by Bell System shown by Defendants' Exhibit 122 over Book Cost shown by Plaintiff's Exhibit A-166, during years 1923 to 1927, inclusive," the sources are explained either in the body of the exhibit or in the heading.

The computations are, in my opinion, correct, and the working papers have been made available to the plaintiff.

In Exhibit X-121, entitled "A. T. & T. Co.—Percent of Relationship of Book Value of Investment in Telephone instruments to Depreciation Reserve for Telephone Instruments, Compared with Per cent of Depreciation deducted from Book Cost or Current Value New as the Basis for Sale to Long Lines and to Licensee Companies, as of Dec. 31, 1927," the figures were taken from Exhibit D-100, and the computations, in my opinion, are correct.

The last column shows the per cent of depreciation deducted from the book value, in the case of the various classes of telephone instruments, and the effect of the sale of telephone instruments, and the clearance through the depreciation reserve.

Exhibit X-122 is entitled "Investments in capital stocks of licensee companies, Dec. 31, 1919 to 1930 inclusive." It shows the par value of the American Telephone & Telegraph Company stockholdings in each of the licensee companies in the United States as of December 31st of each year, 1919 to 1930, inclusive, and shows under each company on the first line the American Telephone & Telegraph Company holdings,—par value; second line, American Telephone & Telegraph Company holdings, book value; and third line, per cent of American Telephone & Telegraph Company ownership in the stockholdings of each of the Licensee Companies, such per cent being the result of the ownership held directly in this company or through the stock of other subsidiaries which is owned by the controlling company.

The figures in the first two lines in the case of each company show the direct stockholdings of the American Tele-
[fol. 7385] phone & Telegraph Company. As shown in the note on the last page of this exhibit, unless otherwise specified, all of the American Telephone & Telegraph Company holdings refer to common stock.

The figures shown in Exhibit X-122 were all taken from the Annual Reports of the American Telephone & Telegraph Company to the Illinois Commerce Commission.

Exhibit X-123 is entitled "Dividend rates of Licensee Companies, during years 1914-1930," inclusive. All of the figures shown in this exhibit were taken from the annual reports of the American Telephone & Telegraph Company to the Illinois Commerce Commission and its predecessor, the Illinois Public Utilities Commission.

Exhibit X-124, entitled "Capital Stockholdings in Licensee Companies showing dividend rates and yields thereon, years 1920-1930, inclusive," shows, during each of the years, the average American Telephone & Telegraph Company stockholdings—par value; the average American Telephone & Telegraph Company stockholdings—book value; the dividend rate on the average American Telephone & Telegraph Company stockholdings—par value; and the yield to the American Telephone & Telegraph Company on average stockholdings—book value. Item I was computed, in the case of all companies, paying dividends during the period, by dividing the total dividends paid by the dividend rate, with proper adjustment when the divi-

dend rate was changed during the year. In the case of the companies paying no dividends during the year, the average par value was determined by an average of the balances at the beginning and end of the year.

Item 2 shows the average book investment in the stocks of the Licensee Companies, and reflects the variations from the par value to the extent that the book investment of the American Telephone & Telegraph Company in such stock differs from the par value of such stock.

The figures in Line 3 represent the dividend rate on the par value, and the figures in Line 4 represent the conversion of the dividend rate to the rate based on the American Telephone & Telegraph Company's investment in the stock shown in Item 2.

The figures in X-124 were all computed from X-122, and [fol. 7386] X-123, and the working papers used in connection with these other two exhibits.

No computation has been made for the year 1931.

Exhibit X-125, entitled "Dividend Rates on Investments in Capital Stocks of Licensee Companies, years 1920-1930, inclusive," was taken from Exhibit X-124. The computations in lines "Average dividend to American Telephone & Telegraph Company on par value of stockholdings in Licensee Companies," and "Par Value of stockholdings on Licensee Companies, exclusive of Illinois Bell Telephone Company," are in my opinion correct.

In Exhibit X-126, entitled "Dividend Yields on Investments in Capital Stocks of Licensee Companies, years 1920-1930, inclusive," the figures for each of the companies were taken from X-124. This exhibit shows the yield on the actual investment in Illinois Bell Telephone Company, and in the balance of the System, resulting from dividend rates paid on the stock held by the American Telephone & Telegraph Company in these various companies.

Exhibit X-127, entitled "Average return to A. T. & T. from Dividends on its Investments in Capital Stocks of Licensee Companies converted into average return to Stockholders of A. T. & T. on their investments in capital stock of A. T. & T. during years 1920 to 1930, incl.," converts the yield to the American Telephone & Telegraph Company from dividends on its investment in the Associated Companies, into average return to stockholders on their investment, in a manner similar to the one I have already described.

In Exhibit X-128, entitled "Profit on investment in capital stocks of Licensee Companies during years 1920 to 1930, incl.," the figures were computed from X-126 and X-108, and the computations are all in my opinion correct, and the working papers have all been made available to the plaintiff.

In Exhibit X-129, entitled "Ratio of capital stockholdings in Ill. Bell to capital stockholdings in all Licensee companies; ratio of profit on stockholdings in Ill. Bell to profit on stockhodings in all Licensee Companies and Percentages of Profit on stockholdings during the years 1920 to 1930, incl.," the figures shown in Lines 1, 2 and 3 were taken from X-124; Lines 4, 5 and 6, from X-128; and Lines 7, 8, 9, 10 and 11 are computations made from these figures and in my opinion are correct.

[fol. 7387] The significant lines on this exhibit are Lines 7 and 8; Line 8 is the ratio of profit or amount carried to surplus of the American Telephone & Telegraph Company from its investment in the stock of the Illinois Bell Telephone Company, to its total profit on stockholdings in all licensee companies.

Lines 7 and 8 show the extent to which the per cent of investment in Illinois Bell and the balance of the System, contributed toward the corporate surplus of the American Telephone & Telegraph Company in the particular years indicated.

In Exhibit X-130, entitled "Amounts Required in Order to Receive the same per cent of return on investment in capital stock of each licensee company as received from investment in capital stock of Illinois Bell Tel. Co. during years 1920 to 1930, incl.," the sources of the figures are Exhibits X-124 and X-128. The exhibit shows the amount in dollars required in order that the American Telephone & Telegraph Company should receive the same per cent return on its investment in the capital stock of each licensee company as it received from its investment in the capital stock of the Illinois Bell during each of the years 1920 to 1930. The figures and the computations are all self-explanatory.

Exhibit X-131, entitled "Losses on Loans to Licensee Companies pro-rated between companies, years 1920-1930, incl.," apportions among the various licensee companies, the losses on loans made to the Bell System, which Mr. Heiss has included in his exhibits as losses to the American

Telephone & Telegraph Company, as part of the cost of the license contract.

The working papers and the method of computation in connection with this have been made available to the plaintiff.

Exhibit X-132, entitled "Profit or Loss on Investments in Licensee Companies, years 1920-1930, incl.," shows the combined return to the American Telephone & Telegraph Company from its investment in each of the Licensee companies, both from stock and from loan investments, and shows the extent to which the combined return exceeded or failed to meet the annual cost of funds to the American Telephone & Telegraph Company during the particular year.

The figures in this exhibit, as to the stockholdings, are taken from Exhibit X-128, and the figures for the loans [fol. 7388] are taken from Exhibit X-131. The computations are, in my opinion, correct.

Exhibit X-133, entitled "Average return from Dividends and Interest on investments (stocks and loans) in Licensee Companies during years 1920 to 1930, incl.," shows the average return on combined investment of the American Telephone & Telegraph Company from stocks and loans of each of the licensee companies, including the Illinois Bell, and from all of the licensee companies exclusive of the Illinois Bell. In my opinion the computations are correct.

Exhibit X-134, entitled "Average return to A. T. & T. from Dividends and Interest on its investments (stocks and loans) in licensee companies, converted into average return to stockholders of A. T. & T. on their investments in capital stock of A. T. & T. during years 1920 to 1930, incl.," converts the per cent of return on investment to per cent of return to the stockholders of the American Telephone & Telegraph Company in a manner similar to the one that I have already described, as shown in the reports of the American Telephone & Telegraph Company and as stated before.

Exhibit X-135, entitled "A. T. & T. Ratio of Capital Investment in Illinois Bell to capital investment in all licensee companies; ratio of profit on capital investment in Ill. Bell to profit on capital investment in all licensee companies and percentages of profit on investment during years 1920 to 1930, inclusive," was prepared from X-132

and shows the extent to which the return to the American Telephone & Telegraph Company from its investment in the Illinois Bell contributed towards its surplus, compared to the return to the American Telephone & Telegraph Company from the other licensee companies, during each of the years 1920 to 1930, inclusive, and shows the ratio of the amount of its holdings in stock or loans of the American Telephone & Telegraph Company in the Illinois Bell to that of the balance of the System. The computations are all computations that I have made myself, and in my opinion they are correct.

(Exhibits X-136 to Exhibit X-143, inclusive, offered in evidence.)

Exhibits X-136 to X-143, inclusive, entitled, respectively, as follows: "X-136—Percentage relationships of average [fol. 7389] investments in capital stocks of licensee companies and in loans to licensee companies to total average investments (stocks and loans) in licensee companies, years ended Dec. 31, 1920 to 1930, inclusive.

X-137—Amounts required in order to receive the same per cent of return on investment (stock and loans) in each licensee company as received from investment in Ill. Bell during years 1920 to 1930, inclusive.

X-138—A. T. & T. Co.—Losses on Holding Funds Available to meet cash requirements of Licensee Companies Prorated between companies on basis of estimated annual requirements years 1920 to 1930, inclusive.

X-139—American Telephone & Tel. Co.—Cost of Furnishing Telephone Instruments to Licensee Companies Year ended December 31, 1920 to 1927, inclusive.

X-140—A. T. & T. Co.—Cost of Other Services Performed under License Contract Pro-rated to Licensee Companies on Basis of License Payments, Years 1920 to 1930, inclusive.

Departmental costs incurred in rendering Licensee Contract Services, during years 1920 to 1930, incl.

X-141—American Tel. & Tel. Co.—(1) Estimate of Costs Incurred in Rendering License Contract Services; (2) Amounts received for License Contract Services Years 1919 (5 months) to 1922.

X-142—A. T. & T. Co.—Separation of the Licensee Payments of each Licensee Company into Component parts

of cost and profit, years ended December 31, 1920 to 1930, inclusive.

X-143—A. T. & T. Co.—Items shown in Exhibit Reduced to Per Cents of the License Payment and to amounts per Telephone Station, Years ended Dec. 31, 1920 to 1930, inclusive," either show on their faces or the working papers which have been submitted to the plaintiff show the sources of the figures, and the basis of the computations.

June 13, 1932.

The Company's showing of income in Exhibit A-53 deducted Federal Income Tax for each year. I have computed the saving in income tax which would have resulted to the Illinois Bell for the years 1923 to 1930, on the basis of the Illinois Bell being financed in the same ratio of loans [fol. 7390] and stock as that which prevailed in the balance of the Bell system as shown in X-136. The amounts of such savings are as follows:

Year	Entire Company	Chicago Division
1923	$77,306	$50,875
1924	107,336	71,196
1925	104,982	69,844
1926	57,413	38,185
1927	79,576	52,528
1928	62,743	41,473
1929	36,026	23,586
1930	134,673	87,079

This saving would be due to the fact that as the loans to the Illinois Bell increased to equal the average of the System, there would be more interest to deduct for purposes of Federal income tax computations. I have the working papers from which these computations were made and the plaintiff may examine them.

Exhibit X-138 shows the distribution of the losses between the various licensee companies, and I took the figures from CR 13. The exhibit does not make any apportionments on the basis of the purpose for which the moneys were held in relation to stocks and bonds. I just lumped those together.

With reference to Exhibit X-142, I used a different method of allocating losses on holding funds to meet the cash requirements of the licensee companies, as indicated in Item 6 of Exhibit X-142, than Mr. Heiss did in Exhibit A-169.

Mr. Heiss allocated the losses sustained in connection with holding funds available for the Chicago area on the basis of a composite ratio using the bases of estimated cash requirements, plant and gross additions.

In making my allocations of Item 6, in my Exhibit X-142, I have used as a basis the estimated cash requirements of the licensee companies only. The sources of information used by the plaintiff were the M. R. and C. R. Reports, indicated in D-118; also the C. R. 13 Reports, and the Provisional Estimates. Of these reports only the C. R. 13's were available to us prior to the trial and prior to the offering of the A-exhibits. We used the C. R. 13 reports in allocating the losses on holding funds available. I included [fol. 7391] Item 2 in Exhibit X-142 because in all documents sent to us prior to the trial, Mr. Heiss included within the license contract costs, losses to the American Telephone & Telegraph Company on holding funds for the purchase of stock and for the making of loans, and losses to the American Telephone & Telegraph Company incurred in connection with loans to the licensee companies, but Mr. Heiss did not show the profits to the American Telephone & Telegraph Company while holding the stock, nor did he take into account any inequality as between the licensees as to the per cent of return paid to the American Telephone & Telegraph Company for moneys furnished in the form of stock and loans resulting from a difference in the dividend rates on the stock or through a difference in the proportions of stock and loan moneys furnished to the licensee companies.

In our exhibits, we have taken into account the losses on loans, losses on holding funds available for stock and loans and have also taken into account the difference in the dividend rates and ratio of loans and stock purchases as between licensees on the basis of the Illinois Bell Telephone Company's return to the American Telephone & Telegraph Company.

The differences, from an accounting standpoint, between the A-exhibits offered at the final hearings on the license contract, and the exhibits which were furnished to us prior to the trial, as bearing upon the license contract are as follows:

First, in the exhibits sent to us prior to the trial there was no separation of costs or expenses incurred chargeable

to the license contract payments for the long lines; instead, the costs allocable to services of the long lines and to the licensees were treated as a unit, but there was added to the revenues from the license contract an amount of revenue as coming from the Long Lines Department.

Second, in the exhibits sent us prior to the trial there was a lump sum deduction from all of the expenses represented to have been incurred in connection with the license contract to represent the amount allocable to holding company operations. In the Heiss exhibits there is a detailed separation for each of the classes of services.

Third, in the papers sent us prior to the trial, there was no allocation to the Chicago Area; nor was there any alloca- [fol. 7392] tion made to the Illinois Bell in any of the exhibits sent us prior to the trial, nor was there any statement made prior to the trial, nor was there any indication given that the Chicago Area would not be charged with losses on loans which Mr. Heiss' exhibits sent us showed were made to the Illinois Bell; and we were advised that the allocation to the Chicago Area would be made at the trial and the method explained at that time.

Fourth, the documents which they sent us showing the allocation made to the Ohio Bell showed a basis of allocation on an entirely different basis than the one they used at the trial.

(Exhibit X-144 offered in evidence.)

Exhibit X-144, entitled "A. T. & T. Co.—Per Cents of Licensee Payments Available for Corporate Surplus (For Profit After Payment of Dividends, Interest, and Amortization Charges) during years 1920 to 1930, inclusive," was prepared from X-142. This exhibit excludes from consideration the equalizing factor of the return from stock and loans, which is Item 2 of X-142, because that factor is considered in a later exhibit. Excepting for that, it takes X-142, and shows the result.

Exhibit X-145, entitled "A. T. & T. Co.—Return on Investment from License Contract Operations with Various Licensees during Years 1920 to 1927, inclusive," was taken from X-142, X-103, D-116 (which is Heiss' Exhibit No. 10 in the Ohio case) and from the statements furnished by the company for the years 1920 to 1922, which are similar to D-116.

The investment was set up to correspond to the item of expense set forth in X-142, such items being the loans to the licensee companies, the proportion of funds held available for the licensee companies, the investment in telephone instruments and the investment in miscellaneous property. The allocations between the companies were made on the same basis as X-142.

The items of return on investment are the same as Mr. Heiss used in Exhibit X-104. In my opinion, the computations in the exhibit are correct.

Exhibit X-146, "American Tel. & Tel. Co.—Return from License Contract Operations with Ill. Bell Tel. Co. in Excess of the Average Return from License Contract Operations with *Other* Licensee Companies during years 1920 to 1927, [fol. 7393] inclusive," was prepared from X-145 for the years 1920 to 1927, inclusive, and from X-142 for years 1928, 1929 and 1930. The comparisons for the years 1920 to 1927 were prepared somewhat differently than for the years 1928 to 1930, inclusive.

During the years prior to 1928, there were amounts available for additional return on investment to the American Telephone & Telegraph Company from the license payment after charging thereto the various amounts allocated in respect to each company. The excess of return on the investment in Illinois Bell for such additional amounts over the corresponding return on investment of the other licensees is shown in Item 6 of X-146.

During the years 1928, 1929 and 1930, there were no amounts left over from the license payments after pro rating the costs between the various companies.

In those years our Exhibit X-142 shows that the license payment was not sufficient to take care of all of the items of cost.

In comparing the showing of the Illinois Bell with the other licensee companies for these years, after charging against the license payment the losses on the loans and the losses on holding funds available, we computed the difference between the amount left over from the license payment to meet the cost of other services in the case of the Illinois Bell and that of the other licensees.

Exhibit X-147, entitled "A. T. & T. Co.—Return from License Contract Operations under Present rates and under Attacked Rates with Illinois Bell Tel. Co., Chicago Division, in Excess of the Average Return from License Con-

tract Operations, with *Other* Licensee Companies, during years 1923 to 1930, inclusive," was computed from X-146, Exhibit A-52, and from an exhibit which will be offered by Mr. Cummings on interstate separation.

In Exhibit X-148, entitled "A. T. & T. Co.—Separation of the License Payments of Illinois Bell Tel. Co., Chicago Division, of other Licensee Companies (including Ill. Bell Tel. Co., exclusive of Chicago Division) and of Long Lines Department, into Component Parts of Cost and Profit Based on Plantiff's Exhibit A-170 and Underlying Exhibits Referred to therein, during years 1923 to 1931, inclusive," the item of license payment was taken from A-53 and D-116, while the remaining items were taken from A-170 and the [fol. 7394] underlying exhibits referred to therein.

The figures shown in X-149, entitled "A. T. & T. Co.—Return of Investment from License Contract Operations with Illinois Bell Telephone Co., Chicago Division, with other Licensee Companies (including Illinois Bell Tel. Co., exclusive of Chicago Division), and with Long Lines Department, Computed from Plaintiff's Exhibit A-170 and underlying exhibits referred to therein, during years 1923 to 1927, inclusive," were prepared from A-170 and underlying exhibits. In Exhibit A-170, Mr. Heiss shows the losses on loans but did not show the amounts of the loans which we took from Exhibit X-103.

Exhibit X-150, entitled "A. T. & T. Co.—Return from License Contract Operations with Ill. Bell Tel. Co., Chicago Division, in excess of the Average Return from License Contract Operations with *Other* Licensee Companies (Computed from Plaintiff's Exhibit A-170 and Underlying Exhibits referred to therein), during years 1923 to 1931, inclusive," was computed from X-149.

Exhibit X-151, entitled "American Telephone and Telegraph Company—Return from License Contract Operations under Present Rates and under Attacked Rates with Illinois Bell Telephone Co., Chicago Division, in Excess of the Average Return from License Contract Operations with *Other* Licensee Companies (Computed from Plantiff's Exhibit A-170 and Underlying Exhibits Referred to therein) during Years 1923 to 1931, inclusive," was prepared from X-150, Plaitniff's Exhibit A-52, and exhibit to be offered by Mr. Cummings and is similar to X-147.

Exhibit X-152, entitled "A. T. & T. Co.—Composite of Estimated Requirements, Plant Investment and Gross Ad-

ditions—Per cent. Long Lines of Associated Operating Companies and Long Lines (Basis of Plaintiff's Exhibit A-169), 1923-1931. Estimated requirements (as shown by work sheets of Plaintiff's Exhibit A-169), 1923-31," consists of the work sheets of Plaintiff's Exhibit A-169, which were furnished by the plaintiff.

The sources for the figures shown in Exhibit X-153, entitled "Ill. Bell Tel. Co.—Comparison of Cash Payments to Western Electric Company with Cash obtained in stock and loans from American Tel. & Tel. Co. Years 1923 to 1930, inclusive," are clearly set forth on the face of the exhibit.

[fol. 7395] As to all of my exhibits, in my opinion, the computations set forth, and the results which are set forth in those exhibits, are all correct. Generally as to all of my license contract exhibits thus far they have not concerned themselves with the question of whether any amounts charged in the license contract were proper, or whether the amounts as charged were proper operating charges. My exhibits merely concern themselves with the distribution of the license payments, and the license contract costs, as represented by plaintiff, between the various licensee companies.

(Exhibits identified by Mr. Rainwater, X-103 to X-153, inclusive, offered in evidence subject to cross-examination.)

(Cross-examination reserved.)

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[fol. 7396] W. M. Hammond, called as a witness on behalf of the defendants, having been first duly sworn, testified as follows:

Direct examination.

By Mr. Goldstein:

June 14, 1932.

My name is W. M. Hammond. I reside at Springfield, Illinois. My present position is chief accountant of the Illinois Commerce Commission. I have had that position about fourteen years and four months. Prior to that, I was assistant chief accountant of the Commission, for approximately two years, and examiner of accounts, for the re-

mainder of the time. I was engaged prior to that in accounting, statistical and financial analysis work. In the [fol. 7397] employ of various railroads—three different companies.

I had charge of the preparation of financial, statistical and operating reports, and spent considerable time in preparing matter for presentation to the State Commissions and to the Interstate Commerce Commission, on rate matters; and some other proceedings.

In connection with my duties as chief accountant for the Illinois Commerce Commission, one branch of the work has been in the handling of investigations in connection with securities issues. Since 1919 I have personally heard for the Commission practically all applications for authority to issue stocks, bonds and other securities.

In connection with those hearings it has been my duty to examine witnesses, to make such investigations as seemed necessary and desirable, to make recommendations to the Commission on the case, and to suggest what I deemed an appropriate form of order.

Under the existing law, applications made to the Interstate Commerce Commission involving railroads operating in Illinois are referred to the Illinois Commerce Commission for the purpose of affording opportunity of making recommendations. Those are handled by me, investigated, and a report made to the Commission, with recommendations to any representations, and if so, what, I deem appropriate to have made before the Interstate Commerce Commission. That involves a study, more or less, of the cost of funds, and the general level of security prices and rates.

I also hear all applications for, and make recommendations to the Illinois Commerce Commission in connection with all plans for the reorganization of utilities under the jurisdiction of the Illinois Commerce Commission.

For the last several years, four or five years, I have heard practically all applications for authority to sell or lease public utility property.

We have a department subdivision covering the preparation and classification of accounts and accounting rules which the Commission prescribes for the use of public utilities, in keeping their accounts.

I also handle accounting matters that may be of joint interest between the Illinois Commerce Commission and the Interstate Commerce Commission, particularly matters re-

lating to the interpretation of existing accounting rules, [fol. 7398] and revisions and changes therein from time to time.

I prepared, with the assistance of my staff, the Uniform System of Accounts for electric utilities, for gas utilities, for water and heating utilities, which was prescribed for use by the Public Utilities Commission of Illinois in 1918.

My department prepares, under my supervision, the forms of reports to be rendered and required by law to the Illinois Commerce Commission, by all utilities under its jurisdiction.

These reports when received are analyzed, and the data prepared for the use of the Commission and others.

In 1931, there were 753 utility companies under the jurisdiction of the Illinois Commerce Commission, representing an investment in Illinois of approximately $1,850,000,000, exclusive of railroad, express and telegraph companies, and the American Telephone and Telegraph Company.

The number of applications for authority to issue securities for the last twelve years under my supervision, has been approximately 1,687 involving issues aggregating more than $2,000,000,000.

I also have supervision over the audit and investigation of accounts and records of public utilities under the jurisdiction of the Commission, the greater part of such investigation having relation to the authorization of securities, reorganization and rate matters.

In connection with the work of the Interstate Commerce Commission, my work has been particularly in the matter of depreciation of telephone property. The Interstate Commerce Commission entered an order on November 1926, which is in the record in this proceeding, Record Volume 1, in which it was provided that the Interstate Commerce Commission would receive recommendations from the State Commissions as to the rates for depreciation of various classes of telephone property.

The Association of State Commissioners has created a committee for the purpose of collaborating with the Interstate Commerce Commission and with other State Commissions with respect to the determination of proper rates for depreciation to be recommended to the Interstate Commerce Commission.

[fol. 7399] Now, the further or final order in this case was entered July 28, 1931, in which the Commission confirmed

the previous order of 1926 with respect to the recommendations of the State Commissions.

During the year 1930, I served as chairman of the Committee of the National Association dealing with this matter. In 1931, I served as a member, and since the early part of 1932, have been serving as chairman of the committee.

I have served on the committee on Statistics and Accounts during the last twelve years, for approximately one-half the time, and have been chairman of the committee a portion of the time.

I was one of three accountants of the National Association who drafted systems of accounts for electric and gas utilities, which have since been approved and are now in use by some twenty-seven commissions, approximately.

In connection with the instant case, I have made certain studies with reference to bonds and stocks.

There were four main studies made on bond issues under my supervision, the work covering a period of twelve months, entailing the work of from three to ten persons. A check of the studies has been going on almost continuously to the present time, both in Chicago and by sending persons to Washington to check the figures against the official records of the Interstate Commerce Commission.

A study was made of 330 long-term bond issues of $5,000,000 or more, issued during the years 1921 to 1931, inclusive, aggregating $6,138,000,000 covering railroads, Bell System telephone companies, and public utilities other than the Bell System companies, in respect to the annual cost to the company and the yield on offering price of the issue, where the authorization of such issue was approved by the Interstate Commerce Commission or by one or more of ten State Commissions from whose official records information was obtained.

The State Commissions from which the information was obtained were as follows:

California, Maryland, New York, Illinois, Massachusetts, Ohio, Wisconsin, Maine, New Jersey, and Vermont.

Of these issues we have made a further study of 271 of the 330 issues which were issued during the year 1923 to 1931, aggregating $5,184,000,000 to show the spread between the [fol. 7400] annual cost to the company and the yield on the offering price of the issues, grouped according to Moody's investment rating in the year of offer.

The second study was a study of 878 long-term bond issues

of $5,000,000 or more, issued during the years 1923 to 1931, aggregating $14,345,000,000 of railroads, the Bell System Telephone Companies, public utilities other than the Bell System, and industrial and other companies in respect to the amount offered and the proportion of the total offering in each case grouped according to Moody's investment rating at the time of offering.

The third was a study of the yield on offering price of the 829 bond issues of $5,000,000 or over and issued during 1923 to 1931, aggregating $13,809,000,000, issued by railroads, Bell System Telephone Companies, public utilities other than the Bell System companies, and industrial and other companies in respect to the yield on public offering price of the bonds classified according to their investment rating when issued.

After excluding from the 829 issues all convertible bond issues and bond issues carrying stock purchase warrants, a further (the fourth) study was made of the remaining 720 issues aggregating $11,347,000,000 in respect to the resale price of such issues for each of the years from the date of issue to 1931, inclusive, grouped according to the investment rating at the date of issue and also grouped according to the investment rating in the year of resale.

The result of these studies has been reduced by me to summaries shown in exhibit form and in charts.

These summaries and charts have been reprodnced in detail in connection with each of these studies, grouped according to subject matter.

They have also been reduced to exhibit form, and copies of them have been furnished to the plaintiff.

In my opinion, through the use of these sheets, the accuracy of the charts and the summaries, and the method of their computation, can be determined.

Exhibit X-227 is a chart entitled "Cost to companies, yield to public and spread between cost and yield on offering price of bonds," is a graphic reproduction of Exhibit X-229.

I think it is fully self-explanatory.

Exhibit X-228 is a chart entitled "Spread between annual [fol. 7401] cost to company and yield on public offering price, 330 bond issues, 1921-1931, aggregating $6,138,000,000," is likewise a reproduction from Exhibit X-229. It is based on figures in the last three columns of X-229.

Exhibit X-229 is entitled "Comparative statement show-

ing cost to companies and yield to public on bonds issued by Bell System, Railroads and Public Utilities, other than Bell System, average for each year 1921 to 1931, inclusive."

The heading states the subject matter. The figures underlying the computations relating to the cost of the company were taken from the official records of the Interstate Commerce Commission.

The figures for the railroads were likewise taken from the Interstate Commerce Commission, and, for the public utilities, were taken from the official records of the Illinois Commerce Commission and from the records of the State Commissions above stated.

The figures underlying computations under "yield to the public," were taken from the Commercial and Financial Chronicle and Moody's Investment Manual, and Poor's.

The spread between the average cost to the company and the average yield to the public is the difference between the first and second groups of figures.

Exhibit 230 is a chart entitled "Bonds grouped by ratings (Moody's) showing amount in each group and its proportion to total offering, 878 issues, 1923-1931, aggregating $14,345,000,000."

This exhibit shows for the Bell System, railroads, public utilities and industrials, the percentage of total amount of bonds issued in each year represented by each classification of bonds based on Moody's ratings.

Exhibit X-231 is a chart entitled "Bonds grouped by ratings (Moody's) showing amount in each group and its proportion to total offering, 878 issues 1923-1931, aggregating $14,345,000,000."

It shows the same facts as X-230 in different form, together with some additional amounts representing issues on which Moody's ratings were not available.

Exhibit X-232 consists of three pages and is entitled "Comparative summary showing amount offered and proportion of total offerings of Bell System, railroad, public utility (other than Bell System) and industrial and other [fol. 7402] bond issues of $5,000,000 and over, issued during years 1923 to 1931, inclusive, grouped according to investment rating at time of public offering."

This exhibit shows the figures on which Exhibits X-230 and X-231 are based.

Exhibit X-233 is a chart entitled "Spread between annual cost to company and yield on public offering price, 271 bond

issues 1923-1931, aggregating $5,184,000,000, grouped by ratings (Moody's)."

This exhibit is I believe self-explanatory. It shows in graphic form the data given in the last three columns of Exhibit X-235.

Exhibit X-234 is a chart entitled "Trend of spread between annual cost to company and yield on public offering price, 271 bond issues, 1923-1931, aggregating $5,184,000,000, grouped by ratings (Moody's)."

This exhibit also shows in graphic form the data shown in the last three columns of X-235 and is I believe self-explanatory. It is noted here again that the ratings are of the year offered.

Exhibit X-235 is entitled "Cost of money to Bell System, railroad and public utility companies and yield to public on bonds issued in years 1923 to 1931, inclusive, classified according to investment rating when issued."

The heading states the subject matter. The exhibit contains the detail for Exhibit X-233 and Exhibit X-234.

Exhibit X-236 is a chart entitled "Trend of weighted averages of bond yields on public offering price grouped by ratings (Moody's), 829 issues, 1923-1931, aggregating $13,809,000,000."

This exhibit is apparently well described on the face of it. I might say, it shows in the upper portion all of the bond issues, including the convertible issues and issues with stock purchase warrants, and in the lower portion of the exhibit, the issues excluding the convertibles and those with stock purchase warrants.

Exhibit X-237, is entitled "Average yield on bonds sold during years 1923 to 1931, inclusive, classified according to investment rating when issued, Bell System, railroads, pub-
[fol. 7403] lic utilities, industrials and others—includes issues of $5,000,000 or over—yield based on offering price."

This exhibit contains the details graphically presented in X-236.

Exhibit X-238 is a chart entitled "Trend of averages of bond yields on re-sale, from date of issue to 1931, grouped by ratings (Moody's) on public offering."

This exhibit I believe is self-explanatory. It is a graphic presentation of the details shown on Exhibit X-239.

Exhibit X-239, consisting of three pages, is entitled "Average bond yields based on re-sale prices during each year, 1923 to 1931, inclusive, Bell System, railroads, public

utilities, industrials—based on high and low market prices of issues of $5,000,000 and over."

It contains the data on which X-238 is based.

Exhibit X-240 is a chart entitled "Trend of averages of bond yields on re-sale from date of issue to 1931 grouped by ratings (Moody's) in year of re-sale."

This is a graphic presentation of the details shown in Exhibit X-241.

Exhibit X-241, consisting of three pages, is entitled "Average bond yields based on resale prices during each year 1923 to 1931, inclusive, Bell System, railroads, public utilities, industrials—based on high and low market prices of issues of $5,000,000 and over."

This is a tabulation which contains the figures on which X-240 is based.

Exhibit X-242 is entitled "Trend of averages of bond yields on resale from date of issue to 1931, grouped by ratings (Moody's) in year of resale."

It is a graphic presentation of the data shown in Exhibit X-243.

Exhibit X-243, consisting of seven pages, is entitled "Average yield on resale of bonds 1923 to 1931, inclusive; yields on cumulative classification (according to investment rating) showing average yield in each year on all bonds of the same class issued in 1923 and in subsequent years to and including the indicated year of resale."

The heading states the subject matter. The exhibit contains the figures on which Exhibit X-242 is based.

Exhibit X-244 is a chart entitled "Trend of averages of yields of bonds issued in years 1923 to 1931, resold in each [fol. 7404] year grouped by ratings (Moody's) in year of resale."

This exhibit is a graphic presentation of the data shown in Exhibit X-245. It gives in final form the picture of the securities, and the market, for the period including 1931.

Exhibit X-245, is entitled "Weighted average yield on resale of bonds, 1923 to 1931, inclusive, showing weighted average yield on each class, including resales of all bonds issued from 1923 to year of resale—year of Resale and Yield."

This exhibit contains the figures on which the preceding chart, Exhibit X-244 is based.

Exhibit X-246 is a chart entitled "Range of averages of

bond yields on public offering price; grouped by ratings (Moody's), 829 issues, 1923 to 1931, aggregating $13,809,000,000."

The heading states the subject material. It is the graphic presentation of the data shown in Exhibit X-247.

Exhibit X-247 is entitled "Range of averages of yields on public offering price of bonds grouped by investment ratings (Moody's) 1923-1931, inclusive, showing the highest average yield on any issue within its class, and the lowest average yield on any issue within its class, based on offering price. (Includes convertible issues and issues with stock purchase warrants.)"

This includes the figures in detail which are presented in graphic form in Exhibit X-246.

Exhibit X-248 is a chart entitled "Range of averages of high and low bond yields on resale from date of issue to 1931 grouped by ratings (Moody's) in year of resale."

It is a graphic presentation of the data presented in Exhibit X-249.

Exhibit X-249 consisting of four pages, is entitled "Range of averages of high and low bond yields on resale prices grouped by investment rating (Moody's) in year of resale 1923 to 1931, inclusive, showing an average of the highest yields established during the year on all issues in each class, compared with an average of the lowest yields established on all issues in the class."

This exhibit contains the figures that are presented in graphic form in Exhibit X-248.

Exhibits X-227 to X-249 are concerned with bonds.

[fol. 7405] I have also made a study of the average yield on common stocks grouped according to Moody's investment rating of the companies' bonds, and that study is reflected in Exhibit X-250.

X-250 is a chart entitled "Public Utilities—average yield on common stocks compared with average yield on bonds grouped according to Moody's rating of the companies' bonds."

A study was made of the average yield on common stocks grouped according to Moody's Investment rating of the company's bonds. The average yield on stocks is based on the average of the high and the low market price for each year and the cash dividends paid thereon. The result is shown in graphic form in Exhibit X-250. The data on which

this chart is based are contained in Exhibit X-251. The source of this data is from Moody's Investment Manual.

Exhibit X-251 consisting of two pages is entitled "Public utilities.—Average yield on common stocks compared with average yield on bonds." This comparison includes only those companies issuing bonds from 1923 to 1931, inclusive (in amounts of $5,000,000 or over), whose stocks have been traded in open market. The stocks of these companies have been grouped according to the investment rating of the companies' bonds.

This exhibit contains the figures on which Exhibit X-250 is based.

I have also made a study of the sources of funds invested in fixed capital of public utilities operating in the City of Chicago, particularly the Illinois Bell, the Commonwealth Edison Company and the Peoples Gas Light and Coke Company, and such study is reflected in Exhibit X-252, which is a chart entitled "Source of funds invested in fixed capital—public utilities operating in City of Chicago."

I made a study of the sources of funds from various sources used by these companies. The result of the study is embodied in two exhibits, X-252, being a graphic presentation of the data shown in X-253. The sources of the data shown in these two exhibits are the records of the Illinois Commerce Commission, and Moody's Manuals. The exhibits I believe are self-explanatory.

I have furnished a copy of this exhibit to the plaintiff, [fol. 7406] and my working papers showing the details are available to the plaintiff.

Exhibit X-253 consisting of three pages is entitled "Source of funds invested in fixed capital in Illinois Bell Telephone Company." That is the exhibit which shows the detail for Exhibit X-252.

In connection with the Illinois Bell Telephone Company, I have made a further study of the source of funds invested in fixed capital, which was more extensive than the study shown in Exhibit X-252, in that it covers the period from 1913 to 1931, whereas Exhibit X-252 covers only the period from 1927 to 1931.

I obtained the figures in connection with the Commonwealth Edison Company, from Moody's Manuals, checked with the reports filed with the Illinois Commerce Commission. These are the Moody's Manual figures furnished by

the company. So far as I know, there has been no charge-off of surplus as yet.

Exhibit X-254 is a chart entitled "Illinois Bell Telephone Company—source of funds invested in fixed capital."

This includes the years 1913 to 1931, inclusive. The result of the more extensive study of the Illinois Bell history is shown in Exhibit X-255, entitled "Illinois Bell Telephone Company—entire company—investment in Fixed Capital compared with total capital obligations and surplus, years 1913 to 1931, inclusive." The data shown in both Exhibit X-254 and Exhibit X-255 were taken from the books of the Telephone Company.

Exhibit X-255 has already been described sufficiently.

I also made a study of the average funds used in the business of the Illinois Bell, the Commonwealth Edison Company and the Peoples Gas Light and Coke Company.

This study is reflected in Exhibit X-256 and Exhibit X-257. Exhibit X-256 is entitled "Average cost of funds used in business of Illinois Bell."

The data concerning the Illinois Bell Telephone Company are data taken from exhibits already presented in this case. The information concerning the Commonwealth Edison Company and Peoples Gas Light and Coke Company was taken from Moody's Manual, and checked with the reports to the Illinois Commerce Commission.

Exhibit X-257 is entitled "Average yield on bonds of Illi-
[fol. 7407] nois Bell Telephone Company and on bonds of other public utilities operating in Chicago (exclusive of transportation companies) years 1923 to 1931."

The heading states the subject matter. I might say that all of the figures thereon that relate to the yield on the Illinois Bell bonds, and of the Commonwealth Edison and Peoples Gas Light and Coke Company, were taken from Moody's Manuals. The three lines on the lower part of the sheet are a reproduction of figures appearing in Exhibit X-256, merely used here for comparative purposes.

I have also made a study, for the years 1921 to 1931 of securities issued under the authority of the Illinois Commerce Commission and its predecessor, in comparison with all public utility issues in the United States.

That study is reflected in Exhibit X-258 entitled "Securities issued under the authority of the Illinois Commerce Commission and its predecessor in comparison with all public utility issues in the United States."

This is a study which shows for the years 1921 to 1931, both inclusive, the securities issued under the authority of the Illinois Commerce Commission and its predecessor, in comparison with all public utility issues in the United States, as shown in the exhibits developed in these studies.

The issues authorized by the Illinois Commerce Commission, which are the subject matter of this study, aggregate $464,000,000. The total for the entire country including Illinois utility issues is $7,504,087,000.

My working papers showing the detail for this exhibit, are available to the plaintiff.

I also made a study of the yields on the common stock of the Bell System Companies, 1921 to 1931, as shown on the exchanges, and for the American Telephone and Telegraph Company, for the period 1901 to 1931, based on data in Moody's Investment Manual, and the results of this study are shown in Exhibit X-259, and Exhibit X-260.

Exhibit X-259 is entitled "American Telephone and Telegraph Company—Common stock—High and low selling prices and yields, 1901-1919"—page 1; and on page 2, "American Telephone and Telegraph Company—Common stock—High and low selling prices and yields, 1920-1931."

I believe it is self-explanatory.

[fol. 7408] Exhibit X-260, is entitled "Yields and average yields on high and low market prices of common stocks of Bell System Companies sold on exchanges during years 1921-1931, inclusive."

I think it is self-explanatory. The descriptive matter on the exhibit I think fully explains the contents.

Exhibit X-261, entitled "Amount of and high, low and average annual yields on all bonds of Bell Telephone system, Railroads, Public Utilities and Industrial corporations, issued in amounts of five million dollars and over, maturing in five years or more from date of issue, years 1921-1931, inclusive, issues from 1923-1931, incl., being classified according to Moody's ratings," and X-262, entitled "Statement showing all bonds of Bell Telephone System, Railroads, Public Utilities and Industrial corporations issued during years 1921-1931, incl., in amounts of five million dollars and over, maturing in five years or more from date of issue, name of issuing company, amount of issue, interest rate, offering price, high and low resale price and average annual yield," are books which contain all of the detail

underlying the Exhibits X-227 to X-260, which are being offered in connection with my testimony.

All of these Exhibits X-227 to X-226 have been very carefully checked, and I believe that they are correct.

(Exhibits X-227 to X-262, both inclusive, offered in evidence. Ruling reserved until the cross-examination.)

R. C. Rainwater, recalled as a witness on behalf of the defendants, having been previously duly sworn, testified further as follows:

Direct examination.

By Mr. Goldstein:

June 14, 1932.

In my opinion, the computations made in each of the exhibits about to be offered in evidence, X-272 to X-304, are correct, and the facts contained therein are correctly taken from the sources indicated.

Exhibit X-272, entitled "Rate of interest on capital stock installments paid by Ill. Bell to A. T. & T. converted into [fol. 7409] average return to stockholders of A. T. & T. on their investments in capital stock of A. T. & T. during years 1920 to 1930, inc.," was taken from the books of the Illinois Bell, and from Exhibit X-108 and is self-explanatory.

Exhibit X-273, entitled "Return on Investment (capital stock issued, capital stock installments and loans) from dividends on capital stock issued, interest on capital stock installments and interest on loans of Ill. Bell during years 1920 to 1930, incl.," investment in capital stock issued was taken from X-124; capital stock installments from the books of the Illinois Bell; loans from X-131; dividends on capital stock from the reports of the American Telephone & Telegraph Company to the Illinois Commerce Commission; interest on capital stock installments from the books of the Illinois Bell; interest on the loans was computed from X-131.

Exhibit X-274, entitled "A. T. & T. Co.—Return on Investment (Capital stock issued, Capital Stock Installments, and Loans) from Dividends on Capital Stock Issued, Interest on Capital Stock installments, interest on loans, and Undivided Profits of Illinois Bell Tel. Co., during Years

1920 to 1930, inc.," is computed from X-273, with the addition of the undivided profits which were computed from the annual reports of the Illinois Bell to the Illinois Commerce Commission, and allocated to the American Telephone & Telegraph Company on the basis of stock ownership.

Exhibit X-275, entitled "A. T. & T. Co.—Percentage of Undivided Profits, Allocable to A. T. & T. Co. Stock Ownership, to investments by A. T. & T. Co. in Common Stocks of Licensee Companies, during years 1920 to 1930, incl.," was taken from pages 300 and 301 of the annual reports of the licensee companies to the Interstate Commerce Commission and allocated to the investments of the American Telephone & Telegraph Company in the stocks of the various companies on the basis of the stock ownership, computed from X-124.

Exhibit X-276, entitled "A. T. & T. Co.—Percentage of Undivided Profits of Licensee Companies to investments by A. T. & T. Co. in common stocks of Licensee Companies, converted into Average Return to Stockholders of A. T. & T. Co. on their investment in Capital Stock of A. T. & T. Co. during years 1920 to 1930, incl.," was computed from X-275 and X-108.

[fol. 7410] The source of X-277, entitled "A. T. & T. Co.—Percentage of Dividends and Undivided Profits of Licensee Companies to investments by A. T. & T. Co. in common stocks of Licensee Companies, during years 1920 to 1930 inclusive," was X-275, and the dividends were taken from the annual reports of the American Telephone & Telegraph Company to the Illinois Commerce Commission.

Exhibit X-278, entitled "A. T. & T. Co.—Percentage of Dividends and Undivided Profits of Licensee Companies to Investments by A. T. & T. Co. in Common Stocks of Licensee Companies, Converted into Average Return to Stockholders of A. T. & T. Co. on their investments in capital stock of A. T. & T. Co. during years 1920 to 1930, incl.," was computed from X-277 and X-108.

Exhibit X-279, entitled "A. T. & T. Co.—Percentage of Undivided Profits Allocable to A. T. & T. Co. stock ownership to investments (Stock and Loans) by A. T. & T. Co. in Licensee Companies during years 1920 to 1930, inclusive," was computed from X-275 and X-131.

Exhibit X-280, entitled "A. T. & T. Co.—Percentage of Undivided Profits of Licensee Companies to Investments (Stocks and Loans) by A. T. & T. Co. in Licensee Compa-

nies, converted into Average Return to Stockholders of A. T. & T. Co. on their investments in capital stock of A. T. & T. Co., during years 1920 to 1930," was computed from X-279 and X-108.

Exhibit X-281, entitled "A. T. & T. Co.—Percentage of Dividends, Interest, and Undivided Profits of Licensee Companies to Investments (Stock and Loans) by A. T. & T. Co. in Licensee Companies, during years 1920 to 1930," was computed from X-278, X-280 and X-131.

Exhibit X-282, entitled "A. T. & T. Co.—Percentage of Dividends, Interest, and Undivided Profits of Licensee Companies to investments (Stock and Loans) by A. T. & T. Co. in Licensee Companies, Converted into Average Return to Stockholders of A. T. & T. Co. on their investments in Capital Stock of A. T. & T. Co., during years 1920 to 1930, inclusive," was computed from X-281 and X-108.

In X-283, entitled "A. T. & T. Co.—Dividends on Capital Stock and Undivided Profits Allocable to A. T. & T. Co. Ownership Related to Investment in Capital Stock and Surplus allocable to A. T. & T. Co. ownership of Ill. Bell Tel. [fol. 7411] Co., of all Licensee Companies, and of all Licensee Companies Exclusive of the Ill. Bell Tel. Co., during years 1920 to 1930, incl.," the dividends were taken from the annual reports of the American Telephone & Telegraph Company to the Illinois Commerce Commission; the undivided profits were taken from X-275; the investment in capital stock was taken from X-124; the corporate surplus was taken from page 300 of the annual reports of the licensee companies to the Interstate Commerce Commission and was allocated to the American Telephone & Telegraph Company on a basis of stock ownership indicated in X-124.

Exhibit X-284, entitled "A. T. & T. Co.—Return on Investment (including Surplus) in Ill. Bell Tel. Co., in All Licensee Companies, and in All Licensee Companies exclusive of Ill. Bell Tel. Co. during years 1920 to 1930, incl.," was taken from X-283 and X-131, and the information as to the capital stock installments was taken from the books of the Illinois Bell.

Exhibit X-285, 28 pages, is entitled "American Telephone & Telegraph Company—Excess of Return to A. T. & T. from Investment in Illinois Bell Telephone Company over Average Return from Investment in Other Licensees, showing Excess of Dividends, of Interest on Loans,

of Interest on Capital Stock Installments, and of Undivided Profits."

Exhibit X-286, entitled "American Tel. & Tel. Co.—Percent of Undivided Profits and Dividend Payments to Capital Stock during years 1920 to 1930, incl.," shows the earnings on the average capital stock of the American Telephone & Telegraph Company as shown in the annual reports of the American Telephone & Telegraph Company, to its stockholders and the Bell Telephone Securities Manual, broken down into the per cent of earnings paid out in dividends and the undivided profits applicable to such stock, excepting that in X-286 there is also taken into consideration the amortization charges which the American Telephone & Telegraph Company has charged to surplus, but which Mr. Heiss in his statements of the cost of funds included as an expense. The figures in column 1 were taken from X-105. Capital stock and dividend rates were taken from X-108. The computations are self-explanatory.

Exhibit X-287, entitled "A. T. & T. Co.—Return on Funds used in Business, years 1920-1930, incl.," consisting of two sheets, is a combination of A-164 which shows the annual cost [fol. 7412] of funds, that is, the annual amount of earnings paid out by the American Telephone & Telegraph Company, plus the undivided profits, related to the funds used in the business.

It was taken from X-108 and X-286.

Exhibit X-288, entitled "A. T. & T. Co.—Summary of Capital Stock outstanding, during years 1920-1931, incl.," was taken from the Annual Reports of the American Telephone & Telegraph Company to the Illinois Commerce Commission.

Exhibits X-289, entitled "A. T. & T. Co.—Changes in Capital Stock Outstanding since 1922," shows the changes in the capital stock outstanding since 1922, and shows the character of the transactions resulting in the sales.

The sources of this were Standard Statistics (Bulletin A-37 Revised of American Telephone & Telegraph Company), Annual Reports of the American Telephone & Telegraph Company to the Illinois Commerce Commission and data furnished by the American Telephone & Telegraph Company.

Exhibit X-290 entitled "Percent of Undivided profits and Dividend Payments to Capital Stock Long Lines Division during the years 1920 to 1930, inclusive" shows the per

cent of the undivided profits and dividend payments, related to capital stock allocated to Long Lines Division, on the basis of X-104, furnished by the American Telephone & Telegraph Company with the addition of the amortization charges to surplus which were added to conform to the total charges shown in X-108.

The Annual Reports of the American Telephone & Telegraph Company to the Interstate Commerce Commission and to the Illinois Commerce Commission do not show the revenues and expenses of the Long Lines Department apart from the other operations of the American Telephone & Telegraph Company.

The income and expense statement of the American Telephone & Telegraph Company, as a whole are shown in the Annual Reports to the Interstate Commerce Commission, and a footnote appears in connection with these statements in the language as follows:

"This company, in addition to conducting long distance telephone operations, maintains a general financial and administrative organization for the benefit of the Associated Bell Companies. The foregoing revenue schedule, therefore, [fol. 7413] includes, in addition to telephone operating revenues, revenues received under license contracts, under which instruments, and financial, engineering, commercial, legal, accounting, and other services are furnished to such associated companies. The expense schedule includes all the expenses, classable under those accounts, incurred in connection with such activities. For this reason any operating ratio shown in this schedule would be without significance and would not be comparable with that of a company whose activities are confined strictly to telephone operations."

I have another exhibit to be offered as X-301, which shows the return on fixed capital investment in the Long Lines.

"Q. X-291, entitled 'A. T. & T. Co.—Percent of Undivided Profits and Dividend Payments to Capital Stock—Holding Company during years 1920 to 1930, incl.,' consists of two sheets, and is the return to the American Telephone & Telegraph Company stockholders resulting from the Holding Company operations which Mr. Heiss has shown in X-104. The data which does not appear in X-104 came from X-108, is that correct?

A. That is true."

Exhibit X-292, entitled "A. T. & T. Co.—Percent of Undivided Profits and dividend payments to Capital Stock—License Contract Division during years 1920 to 1930, incl.," consisting of two sheets, shows return to the American Telephone & Telegraph Company stockholders resulting from license contract operations, as shown in X-104. The data which does not appear in X-104 came from X-108.

Exhibit X-293, entitled "A. T. & T. Co.—Investments in Capital Stock of Western Electric from Nov. 17, 1915, to Dec. 31, 1930," shows X-99 translated into return to the American Telephone & Telegraph Company's stockholders, and also includes the return on the American Telephone & Telegraph Company's holdings in preferred stock. It shows the return to the American Telephone & Telegraph Company on its investment in stock in the Western Electric Company. The data from which this exhibit was computed is shown in X-294, except as indicated in the footnote.

Exhibit X-294, entitled "A. T. & T. Co.—Return on Investments in Capital Stock of Western Electric, during years 1916-1930, incl.," was taken from the records of the American Telephone & Telegraph Company.

[fol. 7414] Exhibit X-295, entitled "Western Electric Company—Return to Stockholders on Capital Investment," consisting of twenty pages, shows the return from dividends on stock of the Western Electric to the Western Electric investors, including the American Telephone & Telegraph Company, on the basis of cash put into the Western Electric. The data shown in X-295 was taken from City's Exhibit 59, appearing in record volume VI, pages 2064 to 2067, and also from the Annual Reports to the stockholders of the Western Electric Company, Inc., from 1916 to 1930, and also from the Annual Reports to the stockholders of the Western Electric, an Illinois corporation, from 1909 to 1915, inclusive, from D-77 and from a certified copy of the articles of incorporation of the Western Electric, Inc., and the amendments thereto. In connection with these sources, it is important to note the amendment to the Articles of Incorporation of September 29, 1925, which contains the following:

"The capital of the corporation shall be at least equal to the sum of the aggregate par value of all issued shares having par value, plus $5 in respect of every issued share without par value, plus such amounts as from time to time, by resolution of the Board of Directors, may be transferred

thereto, and such capital shall be not less than $52,500,000.00."

Column 3, entitled "Shares of Bonus Stock Outstanding," represents the two thousand shares stated in record, Volume VI, page 2067, to have been acquired by the American Telephone & Telegraph Company as a result of the transaction by which the Western Electric received the manufacturing contract of 1882, and the stock dividends thereafter declared applicable to such stock. The other columns are self-explanatory. For the period 1916 to 1930, Average Annual Return to the company's investors on all capital stock issued is treated on two bases.

Basis 1 is shown on page 3, and basis 2 on page 14. The necessity for using two bases arises from the fact that in November, 1915, the American Telephone & Telegraph Company and the minority stockholders exchanged 150,000 shares of par value common stock for 150,000 shares of preferred stock redeemable at $120 per share plus 150,000 shares of no par value common stock.

In 1917, 150,000 additional shares of preferred stock were issued which was redeemable at $120 per share.

[fol. 7415] In 1920 the 300,000 shares of preferred stock were retired at $120 per share, and at the same time 200,000 shares of new common stock was issued to the same stockholders at $180 per share.

Basis 1 treats the retirement of the preferred stock as a distribution of cash, and the subscription to the common stock as a separate transaction.

Basis 2 treats the retirement of the preferred stock at $120 a share and the subscription to the common stock at $180 a share as an exchange of one share of preferred stock for two-thirds of a share of common stock. Page 19 shows the earnings available for the common stock as shown in the annual reports of the Western Electric Company related to capital and surplus.

The other sheets of this exhibit show the return from the dividends on the investment of the stock investors in the various issues from 1916 to 1930. They also show the extent to which the dividends paid out by the Western Electric for the period 1916 to 1930 came from current earnings, or earnings accumulated prior to the organization of the company in 1915.

Exhibit X-296, entitled "A. T. & T. Co.—Percents of re-

turn on investment from all operations—classified during years 1920 to 1930, incl.," was computed from X-286, X-290, X-291, X-292, X-294, X-284 and X-145.

It shows the per cent return on investment from all operations, classified, and compares the return of the Illinois Bell with that of other licensees. It shows the break-down of the return on entire company transactions, as shown in X-287, into the return from various classes of operations of the American Telephone & Telegraph Company. Items 1, 4 and 5 are the main divisions making up item 6. Items 2 and 3 are subdivisions of item 1.

Exhibit X-297, two sheets, entitled "A. T. & T. Co.—Percents of return on Capital and Surplus from all operations—classified during years 1920 to 1930, incl.," shows the conversion of X-296 into a return on capital and surplus.

Exhibit X-298, entitled "A. T. & T. Co.—Percent of return on capital stock from all operations—classified during years 1920 to 1930, incl.," shows the conversion of X-296 into a return on capital stock.

[fol. 7416] Exhibit X-299, entitled "A. T. & T. Co.—Percentages of Return of Licensee Companies on Average Fixed Capital and Materials and Supplies, years 1920 to 1930, incl., and year ended Dec. 31, 1931," is self-explanatory, and was prepared from the sheets of each of the annual reports of each of the licensee companies to the Interstate Commerce Commission, entitled "Comparative General Balance Sheet, Income Account, Telephone Operating Revenues, and Telephone Operating Expenses."

Exhibit X-300, entitled "A. T. & T. Co.—Percentages of Return of Licensee Companies on Average Fixed Capital and Materials and Supplies, less Average Accrued Depreciation years 1920 to 1930, incl., and year ended Dec. 31, 1931," is two sheets prepared from the same source as X-299, and is self-explanatory.

Exhibit X-301, entitled "Comparison of Revenues, expenses and return on investment in Long Lines years ended Dec. 31, 1920 to 1930, incl.," was taken from X-207, X-208, X-104, X-105, and from the records of the American Telephone & Telegraph Company.

This exhibit shows the return on the fixed capital, material and supplies for Long Lines Department, and is the exhibit to which I referred in connection with my earlier exhibit of the Long Lines, investment represented by capital stock and surplus.

Exhibit X-302, entitled "A. T. & T. Co.—Return on Fixed Capital, including General Equipment for Ill. Bell Tel. Co., for all Licensee Companies, and for all Licensee Companies Exclusive of Illinois Bell Tel. Co. years 1920 to 1931," was prepared from X-299 and X-300, and is self-explanatory.

I made a comparison of the per cent of return on the fixed capital of the licensee companies, as shown in Exhibit X-302 and as shown in the American Telephone & Telegraph monthly statistical report CR-51-A, for the years 1920 to 1931.

Exhibit X-303, entitled "A. T. & T. Co.—Comparison of percent of return on fixed capital of all Licensee Companies, as shown in Exhibit X-302 and as shown in A. T. & T. Co. monthly statistical report of C. R. 51-A, years 1920 to 1930, inclusive, and year 1931," shows the comparison and shows the difference between the two.

The CR-51-A reports were not made available to me until after the taking of the depositions in New York in De- [fol. 7417] cember, 1931, and the MR reports underlying CR-51-A were not made available until May, 1932.

(Counsel for defendants states that on September 8, 1931, Mr. Goldstein made the request of Mr. Heiss to make available M. R. reports Nos. 1, 2 and 3 for each of the Associated Companies, for each year, 1923 to 1930, inclusive, and that refusal was made by letter of Mr. Bracelen, dated September 22, 1931.

Counsel for plaintiff states that counsel for defendants thereafter made application to the court for leave to see those reports; that was argued before a full bench, and the motion was denied. That later the plaintiff used certain information from these reports, and that defendants insisted upon their right to see them, and that after long argument plaintiff finally, in order to avoid having any technical question arise on which there might be a reversal after this prolonged trial, allowed them to see everything they wanted to see and to copy everything they wanted to copy.)

With the use of CR-51-A reports, M. R. reports and CR-64-A, from which the data in CR-51-A reports was compiled, or could be checked, or was a basis of check, I would have been able to make the comparison shown in Exhibits

X-299, X-300 and X-302 without the necessity of making the computations from the Interstate Commerce Commission reports.

The information was taken from certain pages of the annual reports to the Interstate Commerce Commission, of the licensee companies, and it took two men approximately six weeks to work out the entire statement.

I checked the figures shown in X-302 with the figures shown in C. R. 64-A, which was made available to me on May 23, 1932.

I checked the total plant in service as of June 30, for the years 1923 to 1931, inclusive, with the average fixed capital shown in X-302 and found the following per cent of differences:

1923, 4.31 per cent; 1924, 4.44 per cent; 1925, 4.40 per cent; 1926, 3.94 per cent; 1927, 1.83 per cent; 1928, 2.90 per cent; 1929, 3.13 per cent; 1930, 1.85 per cent; 1931, 2.20 per cent. This per cent of difference was the excess of the figures shown in X-302 over the average plant in service [fol. 7418] shown in C. R. 64-A, the differences being due partly to the fact that our figures included general equipment, while the figures shown in C. R. 64-A did not.

The computations which I made from the Interstate Commerce Commission reports were from the four sheets which I have mentioned, and involved the use of seventeen hundred odd sheets, which are exhibited in the court.

I did not have all of the annual reports, I just had those four sheets which were sent to me by the Interstate Commerce Commission.

I made a comparison of the per cent of return on fixed capital of the Illinois Bell, as shown in X-302, and as shown in the Illinois Bell monthly report for the years 1922 to 1931, inclusive.

The result of the comparison, the differences, and the explanation of the differences is shown in Exhibit X-304, entitled "A. T. & T. Co.—Comparison of Per Cent of Return on Fixed Capital of Ill. Bell Tel. Co. as shown in Exhibit No. X-302 and as shown in Ill. Bell Tel. Co. Monthly Report No. 1, years 1922 to 1930, inclusive, and year 1931."

(Exhibits X-272 to X-304 offered in evidence. Ruling reserved until after cross-examination.)

* * * * * * *

[fol. 7419] R. C. RAINWATER, recalled as a witness on behalf of the defendants, having been previously duly sworn, further testified as follows:

Cross-examination.

By Mr. Blackman:

June 15, 1932.

I stated on direct examination that I had spent six weeks, or some substantial period of time, in examining the reports of the Bell System Companies and the American Telephone & Telegraph Company to the Interstate Commerce Commission. That is I examined only part of those reports; I stated that I had certain pages of those reports I believe in my testimony yesterday; I did not have all of them. I think we started on that examination about the first or second week of October, 1931. It took about six weeks to make it.

We examined certain schedules, called the comparative general balance sheet, income account, telephone operating revenues, and telephone operating expenses, of the companies that were listed I believe in X-299. I do not recall that we examined the report of the American Company in connection with that examination. I would not have to go to Washington for that. It is made to our Commission annually. A copy of what is filed with the Interstate Commerce Commission is filed with our Commission annually; that is the Interstate Commerce Commission's printed form [fol. 7420] is submitted to us with a little paster on the outside with the Illinois Commission's name on it.

I don't know how many pages of exhibits have been submitted by me in the last two or three days. I have not counted them. There would not be as many as one thousand; about 200 I would say. There are about eighty exhibits and some of them are on one page, and I believe the largest was 28 pages, according to my recollection.

As to the source of these exhibits: I think my testimony will show that I used the annual reports to the stockholders of the Western Electric Company; these pages that I have referred to of the Interstate Commerce Commission's reports; the report of the American Telephone & Telegraph Company to the Illinois Commerce Commission; the various documents which were offered in the previous hearings as City's Exhibits, and which were fur-

nished by the Company; the exhibits of Mr. Heiss in the Ohio case, and the underlying papers connected with that case; sheets that were furnished to me; which were prepared in a similar manner for other years, to those sheets offered in the Ohio case; and in some few instances figures taken from the books of the Illinois Bell Telephone Company. There might have been others. I do not think I can make any general statement that will cover every item. I do not think that I had all of these sources of information in October, 1931. I cannot answer definitely which sources of information we had in October, 1931.

"Q. Can you name a single document, or a single piece of information which you obtained subsequent to Jan. 1 of this year, which you have used in any way in any of these papers which have been offered in evidence on your testimony in the last two or three days?

A. I obtained some of the information from the Illinois Bell Telephone Company since January first."

I presume that all of the books of the Illinois Bell Telephone Company have been open to us at all times. I have never asked for any of their records that I have not received.

I remember that there were some other documents that I obtained since January 1 in connection with these exhibits. I obtained the copies of the Interstate Commerce Commission reports, for the year 1931, only recently, in [fol. 7421] connection with some of the other documents that I used that were furnished by Mr. Heiss.

I cannot remember whether I obtained the documents furnished by Mr. Heiss before January 1st, or since. With the volume of work I have done, it would be impossible for me, without giving some study to it, to determine just the exact date the documents were received. Our work papers may show that. I don't remember. There were some other documents received after January 1st. Some of them are the C. R. 51-A report for the year, 1931. I just received that within the last week or so, and the Exhibits X-299 and X-300 were checked in this respect; that my average plant figures were checked against your M. R. reports, that I inspected here in the court the latter part of May. Those are the M. R. and C. R. reports about which there was so much discussion. I checked them the latter part of May.

I used Exhibit 51-A to check my figures against it, but

I made up these figures before I saw 51-A. Most of these figures in these exhibits were not made up by me last year. We have been working on them since the first part of October, up to the date that they were turned over to the plaintiff for inspection. Some of them I completed. I would not say that most of these sheets that I have offered here were completed last year. I haven't kept any record as to when these sheets were completed, and I would not attempt to answer the question.

"Q. Well, now, you say that you used the M. R. and C. R. reports to check. Your examination of these Interstate Commerce Commission records showed you that all of the information necessary to check any of Mr. Heiss' exhibits, or ratios, and any of the ratios put in by Mr. Crunden were all contained in those Interstate Commerce Commission records, did it not?

A. I don't believe the information as to the average employees was in the Interstate Commerce Commission reports. I don't believe the information as to the estimated requirements was in the Interstate Commerce Commission reports. I don't believe the information as to the provisional estimates was in the Interstate Commerce Commission reports.

Q. Well, now, neither Mr. Heiss nor Mr. Crunden used [fol. 7422] the provisional estimates in developing any of these ratio figures, did they?

A. They used C. R. 13, and the provisional estimates are the underlying documents for C. R. 13."

Mr. Heiss used the C. R. 13's in connection with his Exhibit A-169. The ratios he used had to be developed from the figures he used. He developed his ratios on holding funds available, the ratios he had to use to prorate the losses to Chicago, to the Associated Companies, to Long Lines. I don't know of any other ratio that he developed from C. R. 13. I had the C. R. 13's prior to the time that I put in these exhibits.

I could not answer whether I had the C. R. 13's prior to January 1st of this year. I don't know. I don't remember any particular delay or difficulty in connection with getting the C. R. 13's. I know I had them at the time I prepared one of my exhibits, but the exact date I received the form I cannot remember now. They were furnished to us by the American Telephone & Telegraph people. I think

counsel made the request for them. I don't recall any particular difficulty that I had in connection with getting it.

The figures showing 7.42 per cent for the Illinois Bell Telephone Company for the year 1929, on Exhibit X-133, were obtained from X-132, and show a profit over and above the cost of funds of eighty-nine hundredths of one per cent; by adding the eighty-nine hundredths of one per cent of profit to the cost of funds of 6.53, the total of the two items is 7.42, shown on X-133.

The figure of interest on loans paid by the Illinois Bell Telephone Company to the A. T. & T. Company, shown on X-132, goes back to my Exhibit X-131. Somewhere along the line, in order to get this figure shown in Exhibit X-133, I had to develop the interest on loans, not only in connection with the Illinois Bell Telephone Company, but the other companies. They are all worked out on the same basis.

I haven't the figures here showing what the Illinois Bell Telephone Company paid to the A. T. & T. Company for funds during the year 1929. As near as I can compute it, it would work out on the basis I have used, about 5.54 per cent.

[fol. 7423] Exhibit X-284 shows how much money the Illinois Bell Telephone Company paid to the American Company in the year 1929 as interest on advances. That is the figure I used on that exhibit to represent the payments by the Illinois Bell to the American Company for advances by the American Company to the Illinois Bell in that year. Those figures for each of the years 1923 to 1930, inclusive, are as follows:

1923	$11,280	1924	
1925	134,388	1926	$394,605
1927	221,625	1928	271,801
1929	686,659	1930	32,037

The figures shown in X-133, came from X-132, X-131 and X-128. Exhibit X-131 shows the losses on the loans made to all the licensee companies, including the Illinois Bell. The Illinois Bell losses that I show for each of the years 1923 to 1930 were prorated on the basis of the average loan shown on City Exhibit 142. The loss to the A. T. & T. Company for furnishing "temporary advance" for the year 1929 to the Illinois Bell Telephone Company, I put down as $123,876.75. That loss represents the difference between what the money cost the A. T. & T. and what the A. T. & T.

got. $686,659 is the figure that is shown on X-284 as the amount paid to the A. T. & T.

Referring to the report of the Interstate Commerce Commission, which I say is one of the documents that I used, the interest payments in the year 1929 show a figure in respect to the Illinois Bell of $455,545.33.

I don't think that figure represents the same thing that I was using the six hundred and some odd thousand dollars for. The difference is probably due to the average loans that I used which were furnished to me by the company in connection with Exhibit X-142.

Some of the amounts which I have used in these exhibits as coming from the reports are not direct figures but are derived figures. The six hundred and some odd thousand dollars that I used for 1929 is a derived figure using the figures the company furnished me. The company furnished me with the average loans to the Illinois Bell, which I have used. They furnished me with the loss on the loans which I have used. They furnished me the rate of cost of funds [fol. 7424] which I have used; all were computed from figures they furnished me. I don't think they furnished any rate for the use of funds, but it may be readily computed from the figures they furnished me to be 5.54.

I did not know that the rate which was used over that entire period with respect to the advances of the American Company to every company of the Bell System was the same 5.88, without change. That rate of 5.54 is a simple computation from the figures they furnished me. I am referring to the average loans, the losses on the loans in dollars which were furnished; and they furnished the rate as to the cost of funds, and I used those combined, the three factors to get the interest received.

"Q. Did they furnish you with the information you asked for with respect to these particular matters?

A. We asked for the average loans, and they furnished those figures to us. Now, what method they used of averaging them, I did not go into that. I accepted them as they furnished them."

For the average loans for the year 1929 to all licensees, I have $245,788,267. For the Illinois Bell it was $12,412,500. It is shown on City Exhibit 142. These average loans came to me through counsel, and I assumed that they were furnished by the company. The heading in City Exhibit 142

shows average loans to each licensee company. Then in parentheses here are the words:

"Dividing the sum of the loans outstanding on the first day of January, April, July and October, by four."

I think that that information was furnished as a result of a request to the company to bring down Exhibit 142, to date. The use of those figures in the manner in which I have used them would require, for their accuracy and the reasonableness of such use, that the loans which were in existence at any date taken were the average for the entire quarter. I have some figures here before me that my working papers show that the City Exhibit 142 figure was what I just said. I have it in total for all the companies. I have it for the Illinois Bell. And the monthly average for all loans was $254,234,480, while the quarterly average was $245,788,267.

(Document marked Plaintiff's Exhibit A-218 for identification.)

[fol. 7425] If the loans were actually as indicated on Exhibit A-218 for identification, I cannot tell whether the use of the quarterly averages in the manner in which I have used them would give a figure far in excess of the average outstanding loans because I cannot tell anything about this exhibit as to what the average might be. I did not have the figure shown on Exhibit A-218 for the July 1st quarter. That had to be used to work out City Exhibit 142, which the Company furnished. I haven't the details back of City Exhibit 142, and that is what I would have to have to tell the amount of the loans as of July 1st.

This Exhibit A-218 shows the daily balance of advances and I would not undertake to give what the average was of those figures for the year 1929. Taking the amounts quarterly and dividing by four, would take in the July quarter at a figure of $20,000,000 as it appears to me, from the way the chart is made up. I don't know whether or not that was paid off the next day. Assuming the correctness of the chart that appears to be true. The way in which I have used the figures would presuppose that the $20,000,000 remained outstanding for the rest of the quarter, as to the amount of the principal, but as to the rate, it is a little different when we consider the way I have worked it out. I gave you a figure that worked out to 5.54. You say the rate was 5.88 in that year. That is the extent of the variation, using

this method of averaging as compared to an actual daily average. I think the figure of 5.88 is correct.

"Q. Now, assuming that 5.88 was the rate, and assuming the correctness of those figures, those figures that are set forth in the Interstate Commerce Commission report of four hundred and fifty-five thousand some hundred dollars, you could get the average from those two figures, couldn't you, the average loans?

A. If the interest figures that you showed me on the annual report represent all interest received in loans during the years——

Q. Yes.

A. From the Illinois Bell by dividing by the rate of 5.88 for the average loans could be worked out, but I don't know of my own knowledge that the other companies had all paid exactly 5.88 rate. I did not assume that at all.

[fol. 7426] Q. So, then, you undertook to compare the profits of the A. T. & T. and the financial standing and record of the Illinois Bell with other companies, using these loan payments without knowing whether they were all paying the same rates, is that a fact?

A. I assumed that they paid the same rate, but I do know——

Q. You just said you did not know whether they were paying the same rate, and that is the reason you did not use that.

A. I had no knowledge of my own they were paying a rate of 5.88, because I did not have access to the books of the other companies.

Q. Answer this question directly:

Would you, as an accountant, undertake to do what you have done in these papers, and would there be any justification for it whatever if the companies were not paying exactly the same rate on their loans?

A. That assumes that they were paying the same rate——

Q. No, answer my question, please.

A. Read the question.

Mr. Blackman: Read the question to the witness.

(The pending question was thereupon read.)

The Witness: In prorating these losses on an average——

Q. No. Please answer the question.

A. I don't know any other way to answer it.

Q. My question asks for an answer yes or no. Please give it. Read the question again, please, Mr. Stenographer.

The Witness: Read it again.

(The pending question was thereupon re-read.)

The Witness: No, it would not be justified unless they were paying the same rate, and I assumed that in these calculations."

I cannot say of my own knowledge I knew it. I knew the rate was 5.88 in respect to the Illinois Bell, and I assumed that the others paid the same rate. I made up the figure of 5.54 per cent based on my computation of the average of the Bell System loans for the year 1929. There is a slight error in this figure due to the method I used of averaging the loans.

"Q. Yet, you have compared those figures, which show slight increases and slight decreases with what you call [fol. 7427] the cost to the American Company of money, and worked out figures which show that the Illinois Bell is doing two thousand per cent better than other companies, in some cases, based on these very figures and differences of fractions, isn't that a fact?

A. These companies were all on the same basis of 5.54. They are all on the same basis."

It would amount to my putting them all on the 5.54 basis, so there is no variation in it there as between companies.

I don't see how it could work any variation. They are on the same basis, all on the same basis of 5.54. That is the effect of my computations. I am comparing what they paid with the amounts it cost the American Company.

"Q. And then you take that amount and you combine it with the dividends, and you compare it with other amounts, and you are using these figures which are theoretical figures and incorrect in connection with figures that are actual and real, aren't you? And in which the same error does not occur?

A. Why, I have combined these figures with other figures of return.

Q. Figures that are definite?

A. If that is what you mean——

Q. Figures that are definite and accurate, and you have worked out percentage relationships. Now, don't you know that would be bound to get a wrong result?

A. Well, of course, to whatever extent the average loans, as I have used them, were in error, why, it would affect the final result to some extent; I don't know just how much."

I don't know whether it is a fact that is an error of $5,000,000 or forty or fifty or sixty per cent in the figure of average loans which I used for the year 1929 would make any difference in the result.

If that were shown to be the fact, I cannot say what effect it would have on the calculations, of combining various items of investments and various items of return—there are large amounts involved here, and I would not undertake to say what the effect would be in a matter of that kind.

"Q. Won't you work out for me, briefly—I don't think it will take more than a half a minute—the correct figures [fol. 7428] for the year 1929? We have from the Interstate Commerce Commission report this figure that I have shown you here, as 5.5—$455,543.33. Now, you know the rate was 5.88. Now, as an accountant, I should think you could figure that in about thirty seconds, and tell me what the average loans were?

A. I don't think I ought to be asked to make computations on the witness stand.

Mr. Blackman: I ask the Court to instruct and direct the witness to make the simple computation.

Judge Wilkerson: You make it.

Mr. Blackman: I would like to have him figure it. If he cannot do a simple sum like that, it certainly bears on his competency."

This calculation results in a figure of $7,747,364 as the average loans. The average loans for the year 1929, which we used, is $12,412,500, as shown on City Exhibit 142. The average loans for each of the years 1923 to 1930 can be obtained by dividing the interest payments during each year by 5.88, assuming that the facts as shown in the reports are correct.

(Counsel asks the witness to take down the following figures and check them and report later whether the figures stated by counsel to be correct are correct.)

Year	Witnesses Figures From City Exhibit 142	Stated by Counsel to Be Correct
1923	$200,000.00	$411,394.00
1925	2,317,041.00	1,983,044.00
1926	6,874,656.00	7,511,837.00
1927	3,750,000.00	811,803.00
1928	4,575,776.00	5,321,803.00
1930	550,000.00	12,228.00

"Judge Wilkerson: You mentioned those two figures, 5.88—you spoke of it as something that is generally and thoroughly understood?

Mr. Blackman: Yes, it is thoroughly known throughout the Bell System that that is the rate that has always been charged and is always charged to this company, and to every other company in the Bell System.

Mr. Blackman: If we assume that some of these companies are not paying any rates of interest, that some of [fol. 7429] them are not taking advantage of the discount and are paying the full six per cent, and that the rates which are not paid by some are loaded on others, what effect would that have as to the validity of the comparison? You are seeking to make an Exhibit X-131 and subsequent pages——

The Witness: I don't know just what you mean as to the validity of them.

Mr. Blackman: Please, repeat the question to the witness. I think I am using very simple English language.

(The pending question was thereupon read.)

A. It would affect the exhibits to whatever extent there was a variation from that rate.

Q. As an accountant, you could just throw them out of the window, couldn't you, if that were the fact, is that right?

A. I would not say that."

I certainly would not back exhibits that were not correct. I don't think that the variation in the interest rate paid by these companies that I purport to compare, destroys all the validity of the comparison. It would impair the validity of it to whatever extent the error enters into it and the result is affected.

"Mr. Blackman: Well, the slight impairment of the validity of a figure or two, where you are comparing it with a

figure of 2.2 in order to develop a percentage, may result in very varying amounts, may it not?

A. What is the question?

Mr. Blackman: Read it.

(The pending question was read.)

Mr. Blackman: In widely varying amounts?

A. I don't recognize 2.2 that you are talking about.

Q. I am just taking it for an illustration.

A. It would depend on the amounts, and on the factors involved. I cannot answer your question."

The figure 59.53 per cent in the last line of Exhibit X-111, which is "Per cent of return on investment expressed in per cent of return to A. T. & T. Company stockholders on their average capital stock investment," is a mathematical computation using Exhibit X-108, and using a mathematical formula to convert the figure over to return to stockholders on their portion of the investment.

[fol. 7430] This is what I did: Taking the figure 39.02, shown on X-111, and referring to X-108, there is shown that the average cost of funds for the year 1923 was 6.87 per cent. That is the average cost of money to the A. T. & T. on the funds that it procured from the various sources shown in X-108. I subtracted 6.87 from 39.02, which leaves a per cent of 32.15. The next step, I divided 100 per cent by 63.39, also shown on X-108, and I get a figure of 1.5775358.

The figures I divided by are shown on sheet X-108.

I divided 100 per cent by 63.39. They are both shown. I got 1.5775358. Now, multiplying 32.15 by 1.5775358, I should get 50.74. I haven't the details here before me, but that is what it should work out to. Then I add to that the dividend rate which is included in the average cost of funds, and I get 59.53 per cent. That is the mathematics of it, the way it is worked out.

In line 5, I developed a percentage figure which I call per cent of return on investment, and that is 39.02 per cent. Then, I stepped that up to 59 per cent plus, which I say is the per cent return on investment to the stockholders of the A. T. & T., by deducting the 9 per cent dividend which the stockholders received, plus the combined interest and other things which average out about 6.87, from 39.02, then by applying other figures and adding back the dividend, I get a yield to the stockholders of the A. T. & T. of 59.53 per cent.

"Mr. Thompson: Before the record is closed, I have something I should like to appear of record. Your Honor will remember that a day or two ago there was quite an extended discussion in court about the balance sheet of the Graybar Electric Company for the years 1929, 1930 and 1931.

I have no doubt your Honor remembers it, I have no doubt your Honor remembers that from the end of 1928 the employees of the Graybar, the Graybar management, have owned that corporation.

Judge Wilkerson: Yes, I remember it.

Mr. Thompson: And that the Western has a participating preferred stock. Now, since the adjournment of court, although it has been our thought all the time that we were under no obligation to furnish these figures, and that they have no relation to this controversy, I obtained and I now offer in open court a balance sheet of the Graybar Electric [fol. 7431] Company for the year 1929, one for the year 1930 and (a) one for the year 1931, together with a certificate under the seal of the assistant secretary to the method in which the accounting records of Graybar are kept, so far as relating to property of telephone apparatus, lead-covered cable and supplies is concerned.

Mr. Goldstein: Does that include all of the information that we asked for?

Mr. Thompson: I offer it to you, this is what we have obtained from Graybar, a corporation we do not own, and in which we have an interest as a participating preferred stockholder.

Now, here it is. If you want it, it is available. If you don't, you may use your own pleasure about it.

Mr. Goldstein: Excepting, Mr. Thompson, as my eye glances over this document, it contains more information than the assets and liabilities, it contains profits and losses.

Mr. Thompson: Well, it is a balance sheet.

Mr. Goldstein: Yes, but it shows profits and losses, which is entirely different than a balance sheet.

Mr. Thompson: Is your objection that we have furnished too much?

Mr. Goldstein: No, it is not. I am asking you whether (b) you are offering the profits and losses, or only the balance sheet? You stated you had a balance sheet. I am asking you whether you are offering the whole sheet, with all of

the figures, or only that portion of it which has to do with assets and liabilities.

Mr. Thompson: I am not offering it. I have produced it in court for your information.

Judge Wilkerson: He produces it so you may offer it if you wish.

Mr. Goldstein: He referred to assets and liabilities, and I wondered whether, in view of the previous limitations, we are limited to looking at the lines marked assets and liabilities, or whether we can look at the whole thing.

Judge Wilkerson: Yes, Court and counsel are free to examine it all.

Mr. Haight: We acknowledge receipt of the document, and will later suggest what further we may desire in witnesses, or further facts.

[fol. 7432] June 16, 1932.

Mr. Blackman: We have in court this morning, if your Honor please, the Minute Books of the Executive Committee of the American Telephone & Telegraph Company. Your Honor will recollect that during the testimony of Mr. Heiss, the defendants demanded that those books be produced.

We are producing them subject to that demand, for such use and inspection as you may think proper. Now, of course, we do not think that there is any proper use. Mr. Heiss did not testify to the contents of the resolutions; he testified that he had been directed to set up these amounts for contingent reserve on the books of the Company, and had done it subject to the direction of the officers of the Company, that he had consulted with the officers; but that question was raised, and the books are here."

Cross-examination of R. C. Rainwater continued:

I explained in my direct testimony that all that I put in in Exhibit X-108 were the per cents, that were shown in the second column, and shown in the fourth column, and that I put in certain total figures immediately preceding the grand total. I knew what the statement purported to show. I knew what the figures purported to mean.

"Capital Stock Premium" on the second line of Exhibit X-108 purports to mean an amount of money paid by the stockholders in excess of par, on their capital. I explained at the close of the last hearing how we had worked out

these figures on page 4 of X-108, to develop the percentage of 59.53 per cent, the last figures on X-111.

On page 4 of Exhibit X-108 there is a showing of capital stock premiums of $52,296,147.

If the capital stock premiums, instead of being $52,000,000, had been $252,000,000, I cannot attempt to speculate now on what effect it would have had upon the figure of 59.53 per cent on X-111.

I would not attempt to work it out without having all the details before me. This is a complex mathematical formula, on which this was worked out, and I would not attempt to rework that formula, using other figures, without [fol. 7433] having the opportunity to prepare all of the figures, and work out the proper figure.

As to what effect that change would have on the percentage 59.53 in Exhibit X-111, whether it would be higher or lower, the way the figure is worked out on X-111, it would not make any difference what figure you had in your capital stock premiums, because it is worked out on the basis of the capital stock. It would not make any difference. I said yesterday that I got the figure of 59.53 by using this figure of 63.39. The 63.39 is the percentage relationship of the amount of $719,964,600, to the amount of $1,135,740,062.88. If every one of the figures opposite the lines excepting the totals, and the grand totals remained as they are, and the words "Capital Stock Premiums" had opposite, $252,000,000 instead of $52,000,000 the figure 63.39 would be less. I do not know how substantially less it would be. It would be less. I do not know whether as the capital stock premiums increased, the figure of 63.39 would continue to decrease. If all of the other figures on this particular page of X-108 were to remain constant except the totals, but you were to increase the amount of the premiums, the figure 63.39 would change. As the figure 63.39 decreases, the last figure on X-111, 59.53, would continue to increase. It would continue to increase as long as the capital stock premiums continued to increase, assuming all of the other figures except the totals were to remain stationary.

The percentage 59.53 is the figure of 39.02 shown in X-111, expressed in per cent of return on investment to the American Telephone & Telegraph Company stockholders on their average stock after all of the interest and other carrying charges have been taken out.

That is, it purports to show the return to the stockholder of the American Telephone & Telegraph Company upon his investment in the stock of that company.

If the American Company were earning an 8 per cent return, and all of its stockholders had paid to the company par for their stock, I do not know what return on investment I would get expressed in per cent of return to the stockholders of the American Telephone & Telegraph Company on their average capital stock investment. If you want me to make a computation of that kind, I will be very [fol. 7434] glad to make all of the assumptions that you have made, and report to you what the answer is.

Assuming that we have a little company with a capital of $1,000, 10 shares of $100 par, no bonds, no indebtedness of any kind, just $1,000, and the stockholders have paid in $1,000 for that capital, and assuming that the company is earning $80 a year, then the return on the investment of the company is 8 per cent.

Using the same assumption, the stockholders would be getting an 8 per cent return.

Assuming that instead of paying par for stock in this little company, the stockholders paid $200 for their stock, and the company's capital structure was, capital stock $1,000, and capital stock premiums $1,000, then if the earnings were $80 per year, the company would be earning 4 per cent on $2,000 capital investment.

The company would be earning 8 per cent on its capital stock of $1,000.

"Q. Will you please tell me then how you would figure, what difference that would make in what the company was earning, and what the stockholders in the company were earning, in the way in which you have figured it.

A. Still using the $80 figure?

Q. Still using the $80 figure, yes, sir.

A. Well, if the capital stock was $2,000, and the company was earning $80, why, they would be earning 4 per cent.

Q. They would be earning 4 per cent?

A. Yes.

Q. How much on their capital?

A. How much would the stockholders be earning on the——

Q. Now, how much would the Company be earning on its capital?

Judge Wilkerson: A capital of $1,000.

Mr. Blackman: Yes, sir, the same $1,000.

Q. It would be earning 8 per cent still on its capital, would it not?

A. Yes, sir.

Q. Now, in the way in which you have figured it here, how much would the stockholders be earning on what you have said, per cent of return on investment expressed in per cent of return to stockholders on their average capital stock investment?

[fol. 7435] A. The way I have expressed it—that is, through the method I have followed here, the stockholders would also be earning 8 per cent.

Q. Would they? Would they not be earning 16 per cent, the way you have figured it? On page 4 of Exhibit X-108 you say that the capital stock of the American Company is 63.39 per cent of its total funds. Now, would not that figure be 50 per cent for the little company that we have been discussing, if it had only two items, one its capital stock, and the other its stock premiums?

A. Now, as I understood your last explanation, the total funds of the company were $2,000?

Q. $2,000.

A. Yes,——

Q. And the capital stock represents what part of those total funds?

A. 50 per cent.

Q. What?

A. 50 per cent.

Q. So then that 50 per cent would appear, if we were using the set-up on your Exhibit X-108, page 4,—that 50 per cent would appear in place of the 63.39 which you have used there, would it not?

A. 50 per cent would appear——

Q. Yes.

A. —yes, sir.

Q. Now, then, following the same method that you have followed in these exhibits, you would work out on Exhibit X-111 for this little company that the return to the stockholders is 16 per cent.

A. That is right.

Q. Yes, that is correct. Now, as a matter of fact, you and I know that instead of earning 16 per cent, they are only earning 4 per cent, are they not?

A. I do not know that to be a fact."

If they pay $200 for a share of stock, and got an 8 per cent dividend, they would be getting 4 per cent, but I do not understand that you meant that on the capital stock investment. I was going back to the capital stock only, that is what I had in mind; that is what I was going to take.

If the people have paid $2,000 for their stock and received $1,000 par value of stock, and get $80 per year from the [fol. 7436] company, the actual return on the amount of dollars that they have put out is 4 per cent.

It is not correct to say that by the method which I have followed here, in figuring out the per cent return to the stockholders of the American Telephone & Telegraph Company, I would figure that 16 per cent.

It would depend on which figure you are referring to.

I previously said that following the method which I have used here, assuming the facts with regard to this little company, the return to the stockholders, using the language which I use here, per cent of return on investment expressed in per cent of return to stockholders on their average capital stock investment, I would get 16 per cent.

I stated before, I did not work out the per cent of return on the investment of the A. T. & T. stockholders.

The figure $346,548 in Exhibit X-111 came from X-110.

As I stated before, the method which I have followed applied to the little company with $2,000—$1,000 in capital stock, and $1,000 in capital stock premiums, would result in my figuring out, if I followed the method I have followed here, that the stockholders of that company were getting what I call per cent return on investment expressed in per cent of return to stockholders on their average capital stock investment of 16 per cent, although I concede that they are actually earning 4 per cent on their investments.

Assuming the Company has been in business a few years and has accumulated a surplus of $1,000 so that there is $1,000 represented by 10 shares of stock at $100 each; there is $1,000 represented by stock premiums, the purchasers having paid $200 per share for their stock instead of $100; and there is $1,000 of surplus, and it is still making only $80 as a total per year, that means that the stockholder is getting $4 for every $100 that he paid in.

To figure out the return to the stockholders on the same basis as shown in Exhibit X-111, I want to set up all of these factors in the same way as shown in Exhibit X-108.

"Judge Wilkerson: What is it you are trying to do in this exhibit; what are you trying to express; are you trying to express those figures in terms of something else? Now, what are you trying to do?

[fol. 7437] A. All I was trying to do in the exhibits was, when I showed the per cent of return on investment, to state, after the interest charges and other items payable to outsiders had been taken out of that figure, how much would be available on the stock of the American Telephone & Telegraph Company; that is all I was trying to work out, based on the exhibit that they furnished me, which is A-164 in this case.

Judge Wilkerson: Now, just multiply where you multiplied, and divide where you divided in this exhibit. What per cent do you get—and whether there is any analogy or not, the court will have to decide."

Assuming as in the previous illustration that the little company had $1,000 capital stock, $1,000 premium on stock paid in by the stockholders, and $1,000 surplus, and earned $80 per year, the stockholders would receive 8 per cent on their stock figuring on the basis that I have used in Exhibit X-111. The return to the company would be 2.66 per cent on all of its capital, and 8 per cent on its stock. That is 8 per cent on the capital stock and 2.66 per cent on the total investment.

"Q. I did not ask you that. I said this company had a capital of $1,000, represented by 10 shares of stock of $100 each, and that it had stock premiums of $1,000, and a surplus of $1,000, and that it was earning $80——

A. Earning $80?

Q. —$80. Now, how much return is the company earning?

A. 2.66 per cent.

Q. On all of its capital?

A. That is right.

Q. How much on its stock?

A. 8 per cent.

Q. So that is 8 per cent on the company's investment.

A. It is 8 per cent on the capital stock, and 2.66 per cent on the total investment of the company.

Q. All right. Now, we start with your 8 per cent on the capital stock. Now, assuming 8 per cent on the capital

stock, how much would the per cent of return on investment expressed in per cent of return to stockholders on their average capital stock investment, be?

A. 8 per cent.

Q. 8 per cent?

A. Yes.

[fol. 7438] Q. You are sure of that? Would it not be three times 8 per cent?

A. No, it would not.

Q. Now,——

A. It would be 8 per cent on the—as I use it here, it would be 8 per cent.

Q. Now, refer, please, to your Exhibit X-108, page 4.

A. Yes.

Q. The first figure you develop there is the one that we have been discussing, 63.39, is that right?

A. That is right.

Q. Now, what figure would take the place of that 63.39 on the assumptions that we are making here?

A. 33.33 per cent.

Q. 33⅓ per cent?

A. Yes.

Q. So that, then, according to the procedure you have used, you would use 33⅓ per cent to get from the per cent of return on investment of the company to the per cent of return on investment expressed in per cent of return to the stockholders on their average capital stock investment, would you not?

A. Will you read that question, please. I do not think I understand it.

(Question read by the reporter.)

A. In this particular instance you have cited to me, I would not need to work out any 33⅓ per cent; it would not have any bearing on the calculation that I had to make.

Q. It would not have any bearing?

A. Absolutely not.

Q. Well, now, in telling me how you got there this 59.53 per cent on X-111, did you not use the figure 63.39?

A. Yes, I did——

Q. Did you not have——

A. (Continuing.) —for very obvious reasons.

Q. Did you not have to use that figure?

A. Yes, I did.

Q. Yes. And that figure represented the per cent you have said which the capital stock bore to all the other items shown on that page?

A. That is right.

Q. Now, then, if in the little company I am talking about, [fol. 7439] the capital stock was $1,000, capital stock premiums were $1,000, and the surplus was $1,000, the figure of 33⅓ per cent would take the place of the 63.39 per cent, is that right?

A. It would be—if you set up a statement similar to X-108——

Q. Yes.

A. —yes, sir.

Q. Now, then, if you had 33.33 per cent in this first line, then in proceeding as you have done, you would use 33.33 per cent instead of 63.39 per cent, would you not?

A. No, I would not need to use it at all.

Q. Well, Why not?

A. Well, because the return on investment, as you have stated it, is 2.66 per cent, the average rate paid for funds is 2.66 per cent, and there is nothing to convert over at all.

It is up in the figure on the page of Exhibit X-108, of 8.79 per cent, that you get, on a comparable basis, 8 per cent, and that would still be the return to the stockholders in the American Telephone & Telegraph Company, using the method that I have used. There is no conversion to be made at all; it is the same per cent return on investment and the same per cent of cost of funds shown in X-108. They are the same thing.

Q. Did you not tell me just a moment ago, Mr. Rainwater, before we introduced the figure of $1,000 for surplus, that if the stockholders of this little company paid $200 per share into the company for the stock which they purchased, the method that you have followed here would result in figuring the return, per cent of return on investment, expressed in per cent of return to stockholders on their average capital stock investment, of 16 per cent? Did you not just say that within the last few minutes?

A. I did say that, but I am not sure that I understood all of the factors that you had in the calculation.

Q. You want to withdraw that now, do you?

A. I would like to have you state it again, and I will work it out again, and see if the figure is correct.

Q. All right. We have a company with a capital of $1,000 represented by 10 shares of stock of $100 each. Now, the stockholders have paid $200 for that stock. The company is earning 8 per cent on $1,000, or $80. Now, will you please tell me first of all what return in your opinion the com- [fol. 7440] pany is making on its stock? Can you not answer that question? It has stock, a thousand dollars, and it is making $80. What per cent return is that on the stock? Mr. Rainwater, can you not answer that question?

A. I am trying to figure it out for you.

Q. Trying to figure it out?

A. Yes.

Q. If a company has $1,000 of stock, and is making $80, what per cent return is it?

A. I think my answer should have been, instead of 16 per cent—it should have been 8 per cent.

Q. I am not asking you that question now; I am asking you what per cent return the company that is earning $80 makes on its stock, if it has a thousand dollars of stock?

A. 8 per cent.

Q. 8 per cent?

A. That is right.

Q. Now, you are sure of that?

A. Yes, that is right.

Q. Well, now, suppose it is making that same $80, and it has not only $1,000 of stock, but $1,000 of stock premiums, as well. Now, tell me what per cent on investment expressed in per cent of return to the stockholders on their average capital stock investment, you would work out?

A. If I considered the premiums, too, together with the stock?

Q. Work it out the way you have worked it here.

A. I have already answered your question.

Q. Well, answer it again.

A. I said 8 per cent.

Q. 8 per cent?

A. Yes.

Q. Now, how do you get that; just tell me.

A. If you compare your Exhibit 108——

Q. Yes.

A. —the same setup, the total funds——

Q. Well, just——

A. —would be——

Q. Just please——

A. I am trying to explain how I got it.

Q. All right, go ahead.

A. That is what you asked me for. The total funds would [fol. 7441] be $2,000. They would have paid $80 out to the stockholders. That would be at an average cost of funds, for all funds, of 4 per cent, which is the same as their return on the investment. Now, there is no conversion to make here; it is 8 per cent for the stock. If you consider the premiums, it is 4 per cent for the premiums. That is all—on capital and premiums, it is 4 per cent; that is all that I see that there is to it.

Q. Well, now, will you just make a little sum for me, the same way you have made it here, please, and put in your first line, captial stock—that is $1,000; put in your second, stock premiums, $1,000, or a total of $2,000. Now, then, what figure do you get in your per cent column that corresponds to the first figure on page 4 of Exhibit X-108?

A. Your figure is 63.39, you are referring to now?

Q. Yes, your figure there is 63.39.

A. You would get 50 per cent.

Q. 50 per cent?

A. Yes.

Q. Now, then, will you please take your figure of 39.02 per cent on X-111, and proceed with that figure exactly as you proceeded with the figure as stated in your testimony yesterday?

A. If 63.39 were 50 per cent——

Q. Yes.

A. —and all the other factors were the same——

Q. No, no.

A. —except the total?

Q. No. I am saying, you have this little company; we have your figures, and we have developed a substitute figure of 50 instead of 63.

A. You were talking just now about 39 per cent, and then you say "a little company".

Q. I say, we have——

A. (Continuing) And I do not know which one you are talking about.

Q. We have developed a figure of 50, instead of 63. Now, I want you to start in here on Exhibit 111——

A. All right.

Q. —and use 50 instead of 63, in the same manner in which you proceeded yesterday.

A. And convert the 39.02 over to the other?

[fol. 7442] Q. And convert the 39.02 to per cent of return on investment.

A. All right. The figure would be 73.09.

Q. 73.09; it would be just twice, wouldn't it?

A. No, it would not be. It would be 73.09.

Q. Just give me the calculation on this.

A. The figure 39.02 is the one I am going to start with.

Q. Yes.

A. I am going to substitute 50 per cent in place of 63 per cent.

Q. Yes.

A. I am going to divide 100 per cent by 50 per cent; that is two; that is two times. I am going to subtract 6.87 from 39.02.

Q. What is the 6.87?

A. That is the cost of funds shown on this sheet.

Q. To this company? It has no cost of funds, or its cost of funds is 8 per cent, if you figure it that way.

A. What company are you talking about? Aren't you talking about the American Telephone & Telegraph, now?

Q. No.

A. With all the set of facts you have given me, and then try to apply it to 39 per cent, they have no connections at all. I could not work it out.

Q. You can apply any per cent, can't you?

A. I have tried to give you, using my method, and starting with 39 per cent, to give you what you asked me for, using my X-108, and the answer is 73.09.

Q. 73.09. All right.

A. Yes.

Q. So that the amount that the company gets—the amount that the stockholders get as a return in the way you figure it is almost exactly twice the amount that the company gets?

A. It is whatever the figure is that I have stated to you, related to it. That is what it is.

Q. And, therefore, if you work that same thing back to the little company that we are talking about, and you did not have this cost of money that you have used here, the return to the stockholders on the basis that you have proceeded would be just 16 per cent, and not 8 per cent?

A. No, that is not true. It would have been 8 per cent, because you could not have even in the case of the small [fol. 7443] company a situation that it would not cost them something for their money, and the cost to that company, the cost to them for their money from all sources was 4 per cent, which happens to be identical with their return on the investment, and in arriving at that, the various items, similar to X-108, you have your 8 per cent on the stock, and that is what it still remains.

Q. Well, now, returning to your X-108, suppose the American Company had a surplus of a billion dollars instead of $110,000,000 that appears there on that sheet; can you tell me about how much that would affect the figure 59.53, as you have worked it out?

A. I will be glad to work it out for you and give you the answer. Do you mean, do it now?

Q. Can you tell by looking at it?

A. No, I cannot tell by looking at it, and I would not undertake to.

Q. Will you work it out for me, please, then, and assume these two facts: that instead of fifty-two millions of capital stock premiums, the American Company had five hundred and fifty-two millions of capital stock premiums, and that instead of $110,000,000 of unappropriated and appropriated surplus, it had just a billion dollars more than that; then tell me just how that would affect the figure that you have developed on X-111, the last figure, 59.53.

A. I cannot tell you what the answer would be without working it all out. It involves very large figures here. I would have to arrive at new per cents. I would have to carry the thing all the way through. It would take me——

Q. Take you at least ten minutes, wouldn't it?

A. Probably would, yes.

Q. Then, I will ask that it be done; not now, but at some later time.

Judge Wilkerson: Well, if he doesn't do it, your accountants can do it.

Judge Wilkerson: I understand that this exhibit purports to show what return—the annual return.

A. On the basis of this computation.

Judge Wilkerson: No, I say, you are speaking now of annual return on investment?

A. That is right.

Judge Wilkerson: The purpose of this exhibit is to show [fol. 7444] what annual return the American Telephone & Telegraph Company is receiving on its investment in telephone instruments. Now, you have got a figure of $1,077,794 as their investment in telephone instruments less the depreciation. You take that as the figure which they furnished?

A. That is right.

Judge Wilkerson: The American Telephone & Telegraph Company has that amount of investment in telephone instruments. You take its figure of 6.87, which is the average return shown by this Exhibit A-164, and you get $74,144. Now, you add to that the additional profit to the American Telephone & Telegraph Company, the corporate surplus, and you get that by taking $110,000,000 surplus shown on Exhibit 164, and taking such part of that surplus as is represented by the ratio which the $1,077,000 represents to the entire. Where do you get that figure $346,548?

A. In my Exhibit X-110.

Q. Well, no, what is it?

A. It is the difference between the cost of instruments as I have worked it out, taking into consideration all the expense, taking into consideration an element of return on the money invested, and comparing it with the company's tabulation of what they said was a reasonable allowance.

Judge Wilkerson: Do you mean to say you get an addition to surplus for a single year of that amount?

A. That is right.

Judge Wilkerson: Can you make that computation. You understand what he wants. Have you got it now?

A. I have a computation here on my sheet which I think is what he wants.

Judge Wilkerson: All right.

A. I have shown what per cent it would mean to the American Telephone & Telegraph Company stockholders, if you would consider the capital stock installments, and premiums and the surplus, what this 39 per cent would be, and I have the figure here, which is 47.67 per cent.

Mr. Blackman: I am not asking for that at all. I am asking you to assume the capital stock premiums were $500,000,000 more than they were, and the surplus a billion dollars more than it was, and make the computation and carry it through for me.

[fol. 7445] A. Well, I told you before that those were large figures and would require a number of computations. You told me I could do it later.

Judge Wilkerson: Well, we will take a short recess. See if you can do that.

Mr. Blackman: Have you worked out the figures, Mr. Rainwater?

A. I have worked out the figure that I understood you wanted.

Q. That is the last figure on Exhibit 111. Now, the 59.53 becomes what?

A. Based on the assumptions that you have made, it would become 140.77 per cent.

Q. And that is, as the amount that the people pay for their stock, pay to the company for their stock increases, the return to them in per cent increases in the manner in which you have proceeded?

A. Well, I believe in your computation, you also added a large amount in for surplus.

Q. Yes.

A. A billion dollars for surplus, which is not according to the facts shown here.

Q. Of course not; just using it as an illustration. And the surplus works in the same direction, doesn't it?

A. Yes, if all the other factors are equal, because it reduces the cost of funds."

I will explain how it represents the cost of funds with the illustration that you gave me.

I was asked to add $500,000,000 into the capital stock premiums, for instance. I was asked to add a billion into the surplus.

That increases the total money of the A. T. & T. obtained from all sources 1½ billion dollars. Now, if they did not pay any additional amounts out for dividends or interest, and those figures remain stationary, the cost for funds for that year would be reduced to 2.96 per cent, and using my illustration of 63.39, that figure would become 27.32, and dividing 100 per cent by 27.32 per cent, I would get 3.66. Then, if I subtract this cost of funds from the 39.02 shown on X-111, I get 36.06, which, multiplied by 3.66, becomes 131.98. Then when I add back the dividend of 8.79, which remains stationary, I get 140.77. I think that is what you asked me for.

[fol. 7446] The difference is due to a difference in the cost of money, and the proportions of the stock to the total of all money, those two factors.

The difference in the proportion of the stock to the total funds makes the greater part of this big difference that I have shown here.

In the method that I have worked out here, the more the A. T. & T. stockholders paid into the company for their stock, the bigger the figure I would develop as the per cent of return on investment expressed in per cent of return to the A. T. & T. Company stockholders on their average capital stock investment, but I do not know that you have yourself looked at the sheets that I furnished you. In connection with a number of the sheets that I have furnished you, I worked it out also on the premiums and surplus. I considered those factors of premiums and surplus in some of the sheets that I sent you, but I did not work that calculation out on every possible basis.

I do not know whether any of the other bases have been put in evidence or not. I gave you a figure, though, awhile ago, compared with my 59.53.

I do not think that in these telephone instrument statements that I worked it on the other basis, but I have in some of the exhibits that I prepared.

I have not disregarded the stock premiums and the surplus. I showed right on the face of it what I took. I took the stock only. I did not take anything else.

I have stated that in the computation which I have made with regard to these exhibits which is a complicated one, I find that as the surplus increases, this figure of 59.63 increases, if all the other factors remain stationary.

If one paid $200 or $300 for his stock, there would be a stock premium.

If he paid $100 for the stock, there would be no stock premium.

Assuming that we have $100 paid for stock at par, then there is no stock premium at all.

If you paid $110 for stock, then there would be $10 per share of premium.

If you paid $180 for stock, then there would be $80 premium per share.

As the amount of stock premiums that I deal with in my [fol. 7447] exhibit here, increases in proportion to the stock, my figure of 59.33 would increase.

I don't see how the result would differ whether it was the American Company or what company it was. There would not be any difference in the method because of the difference in the company.

"Q. No difference in the method. Now, won't you get back to that question, after you have worked this out and have seen that the increase in the surplus and the increase in the stock premiums does increase the per cent of return on investment to stockholders, as you have used it here in line 6 of Exhibit 111, and tell me whether it is not a fact that in the way you have proceeded, you would get in the little illustration that I have used an 8 per cent return to the stockholders—an 8 per cent return to the company and a 16 per cent return to the stockholder, neglecting surplus now, taking it step by step?

A. Neglecting the surplus, what do you mean by that?

Q. $2,000, $1,000 for stock and $1,000 for premium.

A. There is no surplus enters into the calculation at all?

Q. No surplus at all, just the simplest possible case.

A. And the return on the investment is $80?

Q. $80, $80 on a thousand, 8 per cent on the stock.

A. And the $80 is the return on the total investment?

Q. Yes, $2,000 the company has had all told, $1,000 of which represents the stock, $1,000 of it stock premiums, and it pays a dividend to its stockholders of 8 per cent.

A. The return is 8 per cent on the stock?

Q. The return is 8 per cent, and it makes no difference in that particular case whether the stock premiums were $1,000 or $10,000?

A. Well——

Q. Is that right?

A. —I do not understand just what you mean——

Q. No, I don't think you do.

A. With your $80, if you are referring to the $80 as being the return on the $2,000.

Q. I am talking of 8 per cent as being the return to the company on its capital stock; just fix that in your mind, 8 per cent is the return to the company on its capital stock. Now, the company's funds consist one-half of capital stock [fol. 7448] and one-half of stock premium. Now, I will ask you whether with those conditions, you do not inevitably work out that the return to the stockholders on the basis you used here is 16 per cent? I thought you saw it when we started the discussion.

A. The company had $1,000—just let me—I would like to have you let me explain how I get at my result.

Q. No, I do not want to know that. Just answer the question, please. We have wasted so much time on this. Tell me now whether the method I have used in developing your exhibits, applied to the simple figures I gave you, don't result in a 16 per cent return to the stockholders.

A. No, it seems to me that it results in 8 per cent.

Q. Well, then, do you think in the case of the simple illustration where we can follow the figures easily, the increasing of the stock premiums makes any difference?

A. You have not increased the stock premiums yet. If you will give me another illustration, starting to increase the stock premium——

Q. All right, I will give you another one. Now, suppose instead of the illustration I gave you, the stockholders paid $1,000 a share for stock worth $100 par, therefore the par of the company is $1,000, but the actual money paid in was $10,000, and there was $9,000 of stock premiums. The stockholders would be making about 72 per cent, wouldn't they?

A. I think I am still not quite clear on one factor that you are assuming.

Q. Yes.

A. Do you assume an 8 per cent on the $10,000 in this illustration, on the $10,000 do you assume an 8 per cent, in other words, $800?

Q. 8 per cent on its stock, Mr. Rainwater.

A. What do you assume on its entire investment?

Q. Eight per cent on its stock. That is the only figure I am giving you.

A. Well, you have to assume some return for me to compare that with.

Q. The earnings and the stock are the two figures which you use to make the comparison, and the comparison works out an 8 per cent, $80 on a thousand.

A. If I understand your computation, that would work out 80 per cent to the stockholders.

[fol. 7449] Q. Eighty per cent to the stockholders. That is, you use my computation?

A. I mean the assumption which was made.

Q. And that is applying to the figures that I gave you the method that you have used in working out Exhibit X-111?

A. Yes."

Based on the assumptions of $8 a thousand or $80, these

stockholders would have been earning less than 1 per cent on the amount of money that they actually put up.

The more the stockholders of the A. T. & T. Company paid for their stock, the higher would be the return to them on their investment (assuming the same dollar dividend) based on just the stock figures only which I have used here without taking the premiums and the surplus.

"Q. That is the way you have proceeded, without taking the premiums and the surplus, except to reduce the percentage of the stock to the total, is that it?

A. I have not reduced the per cent of the stock to the total at all. I have just used figures that you furnished me. I have not made any changes in them."

You furnished me the figures on which I computed the figure of 63 per cent which appears on page 4 of Exhibit 108.

You did not furnish me with that figure of 63 per cent.

I do not think they are unrelated figures.

I use constant figures here. I did not increase the premiums or the surplus. I used the figures that were shown in Exhibit X-108.

"Q. Well, now, you know, Mr. Rainwater, that these figures—this figure of stock premiums is the result of moneys that have been paid for stock in excess of par, you know that, don't you?"

I don't know anything about any of these figures except what the exhibit purports on its face to show.

Referring to the figures on page 4 of my Exhibit X-108, termed capital stock premiums, in the general accepted meaning of what premiums are, it means the amount over and above the par value of the stock.

I know there were premiums paid for the stock of the A. T. & T. Co. I have not the figures that you are quoting, to-wit, that some of the stock sold for $110 and some as high as $180.

The higher the premiums and the more the stockholder in- [fol. 7450] vested, the higher the rate of return would be worked out by the method I have followed, from the same earnings of the American Company, if all the other factors remained equal.

As a bookkeeper, I would say ordinarily that the more a man paid for his stock, the less the per cent return to him from the same amount of earnings, on a total investment would be.

The figures given me yesterday by Mr. Blackman, as the correct average loans of the A. T. & T. to the Illinois Bell, are correct.

Redirect examination.

By Mr. Goldstein:

Since yesterday's hearing I have checked the figures of interest and loans shown in Schedule 213 in the Annual Reports of the American Telephone & Telegraph Company to the Illinois Commerce Commission which were shown to me, together with the following exhibits which Mr. Heiss furnished us, bearing on this subject matter, to-wit: Exhibit X-103, which Mr. Heiss sent us and which I have here in the court room before me, entitled, "Analysis of Estimated Cost of Item 1-D, Carrying Investment in Physical Property used in Rendering License Contract Service; Item 1-E, Holding Funds Available during Period to meet Cash Requirements of Licensee Companies; Item 1-F, Temporary Financing of Licensee Companies."

Also the figures with which the Illinois Bell furnished us, entitled, "Advances from American Telephone & Telegraph Company during the years 1923 to 1925," and which is City's Exhibit 76 in Record Volume VI, page 2097; the exhibit which the Illinois Bell offered in 1929, Plaintiff's Exhibit 78, a continuation of City Exhibit 76 running up to 1929, and which is in Record Volume IV, page 1573. And, also "Supplement to City's Exhibit 76," which continues the advances from the American Telephone & Telegraph Company for the years 1927 to 1931, inclusive, which I have before me.

I have also checked the loans and interest as shown on the books of the Illinois Bell Telephone Company itself and from these I find as follows:

The Annual Reports of the American Telephone & Telegraph Company to the Illinois Commerce Commission, on their face show that the form of the Annual Report was changed in 1926. Prior to 1926 the annual report on its face [fol. 7451] shows only that amount of interest which is accrued and unpaid on particular loans of the licensees which are outstanding on December 31st of the year of the report. That is, the annual reports prior to 1926 only show that amount of interest unpaid on December 31, of the loans that

are unpaid on December 31. They do not show either the amount of loans that were made during the year that have been paid off the day before the year, and they do not show the interest that was paid on all of the loans during the year that were paid off the day before the year, and they don't show any interest or any loans that were carried over from one year to another year, that were paid off before December 31st.

Subsequent to 1926, the annual reports show on their face two columns, first, the interest accrued on the particular loans of the licensee companies which are outstanding at the end of the year, just as appeared in the annual reports prior thereto. That is, if there was a million dollars outstanding on December 31, it would show the interest on that million dollars, but if the million dollars was the balance of a fifty million dollar loan which was outstanding for all but the last day of the year, it would not show the loan of the balance of the fifty million dollars, and it would not show the interest on the fifty million, excepting for this one million dollars.

In the second column, the annual reports after 1926 show on their face the total amount of interest paid during the year by those licensee companies which had loans outstanding on December 31st of that year.

That is, if the Illinois Bell had twenty-five million dollars of loans from the American Telephone & Telegraph Company, and those were paid off on December 28, 1923, the report for the year ending December 31, 1923, would show no loans and no interest.

If the Illinois Bell carried over from 1922 fifty million dollars of loans, and it was paid off on December 28, 1923, and there were no other loans outstanding on December 31st, the annual reports would show no loans, and no interest.

The information, therefore, in the annual reports did not cover the same ground as the ground covered by my exhibits.

My exhibits attempted to take the interest actually paid, as Mr. Heiss showed it in Exhibit X-103, and I distributed [fol. 7452] the actual amount of the loss among the licensee companies as he computed it.

I checked Section 213 of the Annual Reports about which Mr. Blackman spoke yesterday, to see the amount of interest on loans paid by the Illinois Bell and the amount of loans shown in those Annual Reports compared to the

actual loans made by the American Telephone & Telegraph Company to the Illinois Bell and the actual interest paid during those years.

I found that in the year 1927, according to Plaintiff's Exhibit 78 in record Volume 4, page 1573, which facts are also shown in supplement to City's Exhibit No. 76, which has been furnished to us in connection with the present hearing, it appears that there were advances made from the American Telephone & Telegraph Company to the Illinois Bell in the year 1927, as follows: $1,000,000 on March 31, 1927, $200,000 on March 31, 1927, $500,000 on May 2, 1927, $1,000,000 on June 1, 1927, $750,000 on June 13, 1927.

These loans were paid off on or before June 30, 1927. In the annual reports of the A. T. & T. Co. to the Illinois Commerce Commission, Section 213, for the year 1927, the name of the Illinois Bell does not appear; no loans appear for the Illinois Bell; and no interest appears as having been paid by the Illinois Bell during the year 1927.

That is, the plaintiff's own exhibit shows loans were made to the Illinois Bell during the year, and paid off during the year, and interest paid during the year, but the annual reports show neither interest nor loans, because they were not outstanding on December 31st.

Furthermore, as shown in Plaintiff's Exhibit 78, page 1573, of the Record Volume 4, and as shown in supplement to City's Exhibit 76, which plaintiff has just furnished, on December 31, 1926, there were outstanding loans from the American Telephone & Telegraph Company to the Illinois Bell of $13,800,000. Of this, $500,000 was paid off on January 7, 1927, and $13,300,000 was paid off on January 15th, 1927. But nowhere in Section 213 of the annual report does there appear the interest paid by the Illinois Bell to the American Telephone & Telegraph Company for the period of time from January 1, 1927, to the date of payment of this $13,800,000.

That is, the Illinois Bell actually paid interest on $13,- [fol. 7453] 000,000 for fifteen days, but the annual reports could not show them because the $13,000,000 was paid off prior to December 31, 1927.

In the year 1921, according to City Exhibit 76, prepared by the Illinois Bell, there was outstanding on December 31, 1920, advances from the American Telephone and Telegraph Company to the Illinois Bell of $4,000,000. On February 1, 1921, additional advances of $400,000 were made,

and on August 24, 1921, an additional $2,450,000. On August 24, 1921, $6,850,000 was paid off. There was, therefore, on an annual basis average advances of $1,823,333 and neither the loans nor the interest appear in the annual reports for the year 1921.

That is, in the year 1921, there was an average yearly advance from the American Telephone & Telegraph Company to the Illinois Bell of $1,823,333, on which the Illinois Bell paid interest, and the American Telephone and Telegraph Company received the interest, but the annual report was silent both as to the loan and the amount received by the American Telephone and Telegraph Company.

In the year 1922 the American Telephone and Telegraph Company advanced to the Illinois Bell, as shown by City Exhibit 76, prepared and furnished by the Illinois Bell, shows the following loans as having been made to the Illinois Bell:

February 2, 1922, $1,500,000; March 1, 1922, $300,000; March 6, 1922, $1,000,000; May 31, 1922, $1,000,000; June 2, 1922, $300,000; June 30, 1922, $1,000,000; August 3, 1922, $500,000; August 28, 1922, $100,000.

These loans were paid off between June 30, 1922, and September 30, 1922. The average advances for the year were therefore $1,158,077, but nothing appears in the annual report.

When I say the average advances for the year, I mean the advances, which I have just stated, when reduced to an annual basis, would equal a loan of $1,158,077 for twelve months on which the American Telephone and Telegraph Company received the interest, but nothing appears in the annual reports either as to the loan or as to the interest.

For the year 1930, from the supplement to City Exhibit 76, I found the advances from the American Telephone and Telegraph Company to the Illinois Bell outstanding December 31, 1929, of $2,200,000, which amount was paid on January 2, 1930, which, on a yearly basis of average loans [fol. 7454] was $12,228, of which nothing appears in the annual reports of the American Telephone & Telegraph Company.

The books for the year 1920 showed average loans of $2,365,521.

On the basis of taking the interest from the annual reports and dividing by 5.88, one would get $442,755.

For the year 1925, the Illinois Bell Company's books show average loans of $1,983,944, and if you had applied the 5.88 to the interest as shown in the annual report, you would have had $250,000.

On the basis of applying the 5.88 to the interest shown in the annual reports for the year 1920, you would have shown outstanding loans of $12,939,983.

Exhibit X-103 furnished by Mr. Heiss showed for that year $191,500,522.

In 1921, the 5.88 per cent computation divided into the interest shown in the annual report would have shown $16,093,146.

There are some differences that would have resulted from applying 5.88 per cent to the annual reports.

The total differences for the period 1923 to 1930 between the Exhibit X-103 furnished by Mr. Heiss and the computations which would have resulted from applying 5.88 per cent to the annual reports would have been as follows: according to X-103, the loans were $1,626,831,491, and by applying 5.88 per cent to the interest in the annual reports, you would have gotten $1,073,809,794, or $600,000,000 difference.

In X-103, Mr. Heiss showed the actual interest received by the American Telephone and Telegraph Company.

That is $11,511,000 for the year 1920. The interest shown in the annual reports is $760,871.

For the year 1921, the annual reports show $946,000, and Mr. Heiss shows in X-103, $10,595,000.

Similarly, there are differences, for each of the years, between Mr. Heiss' figures in X-103 and the annual report interest.

Those differences in 1922 were: $634,288 in the annual report; $7,813,000 in Mr. Heiss' exhibit; in 1923, in the annual report, $857,671, and $7,605,000 in Mr. Heiss' exhibit; in 1924, $1,020,737 in the annual report, and in Mr. [fol. 7455] Heiss' exhibit, $10,303,397; in 1925, $1,169,546, in the annual report and $13,932,239 in Mr. Heiss' exhibit, and so on.

I also checked the interest which Mr. Heiss showed in X-103, with the average advances for licensee companies shown in X-103, which showed that the American Telephone and Telegraph Company, received interest on those loans, of 5.60 per cent for the year 1929.

On the basis of 5.88 per cent the loans shown in Mr. Heiss' exhibit would have resulted in interest of $14,948,987. Mr. Heiss showed interest in X-103 of $14,554,437, from advances made to the licensees of $254,234,480, and loans of $6,209,209 made to the 205 Broadway Corporation and the Bell Telephone laboratories.

June 17, 1932.

Assuming that a company has total funds of $1,000, of which $500 came from a loan paying 5 per cent interest, $250 from capital stock and $250 from premiums and surplus, and the net earnings are $100, there are several methods that may be used to express the return on investment.

One way of expressing the return on investment would be to say that the company earned 10 per cent on its investment in the business, of $1,000. That would be Method 1. Another way of expressing the return would be to say that as the company had to pay $25 interest on that loan its earnings were sufficient to pay the interest and have available $75 for return on its capital, premiums, and surplus. $75 is equal to 15 per cent on the $500 of capital, surplus and premiums. That would be Method 2, which I understand follows Mr. Blackman's cross-examination of me.

The third method, and the method which was used by the American Telephone & Telegraph Company, would be to say that the company earned sufficient to pay its expenses and its interest, and had $75 return on its capital, surplus and premiums, which return is expressed as 30 per cent on its capital stock of $250. I used these three methods in my Exhibits X-296, X-297 and X-298.

The third method of expression is used by the American Telephone & Telegraph Company in its Annual Reports, and in the Bell Telephone Securities Manual. The earnings are expressed as a certain per cent of return on the outstanding capital stock.

[fol. 7456] Referring to the Bell Telephone Securities Manual, which is Defendants' Deposition Exhibit for identification No. 110, entitled "Bell Telephone Securities, Reference Tables and Descriptions for use of Investors, Investment Houses and Bankers, with a brief introductory statement of the organization and financing of the American Telephone & Telegraph Company and Associated Companies, 1931," which was issued April 15, 1931. On page

10 it shows with reference to the year 1930, net earnings per share of $10.44, and dividends paid per share of $9.

Referring to the Annual Report for the year 1931, which is offered as Exhibit X-307, on page 15 it shows for the year 1930, $10.44 per share. The connection between the last mentioned two documents and Exhibits X-286 and X-287 for the year 1930, is as follows:

Exhibit X-287 shows that on all of its funds in the business, the American Telephone & Telegraph Company earned in the year 1930, 7.21 per cent, that is, earnings available for interest, dividends and amortization charges.

In X-286, this 7.21 per cent is expressed to show how much of the earnings after paying the interest and amortization charges, was available for return on capital stock, capital stock premiums and surplus; but is expressed as a per cent on capital stock outstanding.

X-286 shows that for 1930 the undivided profits and dividends amounted to 10.44 per cent on its capital stock outstanding. This figure is the figure shown in the Annual Report of the American Telephone & Telegraph Company for 1930, and in the Bell Telephone Securities Manual.

The figure for each of the years 1923 to 1930 shown in X-286 ties up with the Annual Reports of the American Telephone & Telegraph Company, and with the Bell Telephone Securities Manual, excepting for a small amount of additional amortization of discount, which the Annual Reports have not considered.

The relation of Exhibits X-286 and X-287 to A-164, of Mr. Heiss, and my Exhibit X-108 is as follows: X-286 shows $10.44 per share is figured on the capital stock of $1,585,669,600, which is the figure which Mr. Heiss showed in A-164 under Average Capital Stock, and which is also shown in X-108 on the first line for the year 1930.

[fol. 7457] I will tie up A-164, X-108 and X-287, for 1930. From X-287 the American Telephone & Telegraph Company is shown to have earned 7.21 per cent on $2,746,624,797 of funds used in the business, which amount of funds Mr. Heiss showed in A-164, and which is shown in X-108. This 7.21 per cent represents earnings available to pay out interest dividends and amortization charges which Mr. Heiss shows in A-164 in the last column, the last line as 6.25 per cent. 10.44, which is the result after deducting the interest and amortization charges, is the return on capital stock, and which was available to pay out the dividend of 8.78 per

cent which Mr. Heiss shows in the first column of A-164, and which is shown in X-108. I will tie up the method used in X-111 to convert the 39.02 per cent to the 59.53 per cent with X-286 and X-287. The formula that I have used in X-111 to convert the 39.02 per cent of return on total funds invested in telephone instruments, to arrive at the 59.53 per cent return available for capital stock premiums and surplus, expressed as a percentage of capital stock only, is the formula which I would use if I were to convert the 7.21 per cent in X-287 to the 10.44 in X-286.

In X-108, I inserted percentage figures which Mr. Heiss did not show in A-164. These percentages are merely to show what portion of the total funds came from capital stock, what portion came from surplus, and what portion came from the funded debt, and what portion came from loans.

They also show what portion of the total dividends, interest and amortization charges would be required to take care of interest and amortization charges and to take care of the dividends on the capital stock. These percentages are inserted as a matter of convenience so as to enable computations to be made from my exhibits to express return from any or all of the operations of the American Telephone & Telegraph Company, by one of the three methods mentioned, namely: 1, a return on total funds; 2, a return available for capital stock, surplus and premiums, expressed as a percentage of such combined surplus capital stock and premiums; or, 3, a return on surplus, capital stock, and premiums expressed as a percentage of the capital stock outstanding. For the year 1923, X-287 shows the [fol. 7458] American Telephone & Telegraph Company earned 8.40 per cent on all its funds available for interest, dividends and amortization.

Exhibit X-111 shows 39.02 per cent to be the return to the American Telephone & Telegraph Company from an allowance of $709,000 for rental of instruments, on the American Telephone & Telegraph Company's investment in telephone instruments.

Exhibit X-286 shows 11.20 per cent as the return to the American Telephone & Telegraph Company from all of its operations in the year 1923, after taking care of all of its expenses and after taking care of the interest and amortization, which was available as the return for capital stock premiums and surplus, expressed as a percentage on cap-

ital stock. As compared to 11.20 per cent on its capital stock available from all of its operations, 59.53 per cent would become available on that portion invested in telephone instruments shown in X-111. My return of 39.02 per cent in X-111 compares with 8.40 per cent in X-287 for the entire company, and my return on telephone instruments of 59.23 per cent in X-111 compares with 11.20 per cent for the entire operations in X-286.

(Defendants offer in evidence Exhibit X-307 entitled "A. T. & T. Co.—Annual Report to Stockholders 1931" and Exhibit X-308, photostatic copies of Section 213 of the Annual Reports of the American Telephone & Telegraph Company to the Interstate Commerce Commission and the Illinois Commerce Commission for each of the years 1920 to 1930, inclusive.)

Recross-examination.

By Mr. Blackman:

I think counsel can answer the question as to the purpose of my testimony relating to the sources from which I could not find the correct figures for the average loans which we had been talking about the day before, better than I can. It is not correct that so far as I am concerned, it had no purpose.

You showed me an Annual Report, and you said I could have gotten the figures for the companies from it. Now, I quoted the figures in the Annual Reports to show that I could not get the figures from the sources that you stated I could get them from. I got the figures shown in City's Exhibit 142. I told you that I had verified your figures, and [fol. 7459] they were correct. The method of making the verification so far as the Illinois Bell is concerned is to go to the books of the Illinois Bell. Of course, we had access to the books of the Illinois Bell, but we did not have access to the books of the other companies. We always had access to the books of the Illinois Bell, and could have gotten those Illinois Bell figures at any time.

The purpose in my testimony concerning the place where I looked for information was merely to show that I was depending upon the figures that you furnished me, which I used, which were based on the quarterly balances. The figures furnished were certain groups of figures showing the average loans of the licensee companies, that were

shown in City's Exhibit 142; I believe is the number, and I think also the later years were furnished as a supplement to City's Exhibit 142.

They were furnished to me through counsel and I used them. I do not know the circumstances under which the original City's exhibit was made up.

That City's exhibit bears across its top in very plain, bold letters, the amounts on January 1st, March 1st, July 1st, September 1st, whatever the quarterly dates are, averaged by dividing by four, but it also shows that these are the average loans during the year, and what was just stated was in parentheses—explaining how the average loans were made up—and how it was worked out.

I had City's Exhibit 76.

I do not know just how to answer your question as to whether there is anything in the testimony that I gave in answer to Mr. Goldstein, which in my opinion shows that the figures opposite the line "Illinois Bell" on X-131, for the years 1923 to 1930, both inclusive, were correct. I told you the figures you gave me were correct, and those are different figures than are shown here. Now those figures shown here are based on the quarterly averages, and the figures you stated, were based on the daily balances. There is that variation.

For the year 1929, on this line I am talking about, on Exhibit 131, I used a figure of $12,412,500. I stated in answer to your question yesterday that the figure you gave me, $7,747,364, was correct.

[fol. 7460] I did not have the correct figures for all of the companies, and I had the loans on one basis for all of the companies, and I used them for the Illinois Bell because that was the same basis there, as for the other companies, and in my opinion it would not have been proper in a set-up of this kind, to show one figure for the Illinois Bell on one basis, and the figure for the other companies on another basis. When I was using these figures for the Illinois Bell, I did not know, as a matter of fact, that they were not correct.

I have seen City's Exhibit 76, but I did not use it in connection with this. I think it would be possible using the dates, to work out the correct figures for this line in question here, from City's Exhibit 76.

"Q. Well it gives you the date of each loan, and when the loan was paid off, and any accountant could very speedily and very easily get the average, could he not?

A. It would be possible to get the average."

When I answered that the figures that you gave me were right, the information was taken from the books of the Illinois Bell. I did not personally go to the books and take it off. I had the information which I had a man take off for me.

I do not believe I had it in my work papers here in court with me, but I obtained it from the papers in our office, after I went back to the office. I do not think I had it here in my possession, by any means.

I have with me here in court the papers from which I obtained it for two of the years, but I have not found the others yet. I have the figures taken off the books here for 1929 an 1930, here before me. I have the analysis of Account 336, analysis of other interest deductions, showing the interest paid, with a notation at the head of the column, "Six per cent minus two—5.88" from which the average loans for the year were computed, for 1929 and 1930. I computed from these figures the average loans for the years 1929 and 1930. I have a paper here which shows the average loans, per the books, for the year 1929, as $7,747,364, and for 1930, $12,228.

That is based on dividing this interest by 5.88. I took some of my work papers and worked this out, and I think these were the sheets that I had for 1929 and 1930. I do [fol. 7461] not know whether I can find the others. The papers now shown to me by counsel (A-219) are not the ones that I got the correct figures from. I have seen them; I think I may have looked at them yesterday. I went through a computation although the figures are stated here correctly, for every year on my papers furnished to plaintiff, because I wanted to check this rate of 5.88 that you told me would work out the correct figures.

These (A-219) are some of the sheets that were prepared under my direction. I did not work them out myself. I prepared the sheets under the direction of counsel and delivered them to counsel for the defendants and they delivered them to the plaintiff. They are not among the papers that I have offered in evidence.

(Plaintiff's Exhibit A-219 offered and received in evidence.)

It is not a fact that when I wanted to find out whether the figures which you gave me were right or wrong, I went

to these papers to find out, and checked them. I went to my work papers, because I wanted to see just what information I had in my work papers.

"Q. And you went to your work papers and figured it all out knowing that you had these where you had already figured it out?

A. You told a figure to me, on the stand, of so many dollars of interest, and I wanted to check that figure."

Exhibit X-115 is a comparison of what was put in the record on page 1038, showing by items the investment, and in Column A the allowance for the telephone instruments; and I have assembled similar items from the exhibits put in by Mr. Heiss in this case, and then I have compared those two presentations with the actual experience, showing the computation of the investment and the cost of furnishing the instruments by items, and then taking out of the total amount for the instruments, the return on investment included in that amount, and working it down to a return on the investment as shown by the books of the American Telephone & Telegraph Company, and allocated to the Chicago Division. That is in general what I tried to do.

In line 7, where I used the legend "Actual return on investment obtained," and the first figure is $454,990, I don't know whether anybody actually received the money or not. [fol. 7462] In connection with that item, I think it is very clear what I meant. I mean this,—that that is the return that would be included in the amount of $709,007; that is what I meant by it; that is the amount that would be obtained if you used the figure of $709,007 as an allowance for the instruments. It would be computed to the Illinois Bell, based on the American Telephone & Telegraph Company's experience. It would be a return of $454,990 to the Illinois Bell if the allowance of $709,007 were given, and the Illinois Bell owned the instruments on the same basis as the American Telephone & Telegraph Company. That is for the year 1923.

Exhibit X-115 refers only to the year 1923, on the heading. I think that is all it is intended to refer to.

I have made other computations for other years not based on the figures in Column A—if you are referring to that. I do not think I used that for other years. In 1923 the Illinois Bell Company owned no instruments and got no return on any instruments.

When I say "Actual return on investment obtained," for the Illinois Bell, $454,990, that is not an actual figure at all. It was not intended to show that it would be an actual figure. By the use of the words "Actual return" I meant, based on these figures that are shown above there on the various assumptions entering into the computation of $709,007, the "actual return" is really what it would be on that basis. At the head of the first column I have "Presentation during the year 1929" and at the head of the second column I have "Presentation during the year 1932." What I meant there was that the presentation during the year 1932 that Mr. Heiss made, as I understood it, was to arrive at a fair allowance for the instruments, and that is in a manner similar to the $709,007. By the use of precisely the same language as the headings of those two columns, I intended to show what this would amount to based on the company's actual experience. There was no intention to imply that they actually received such an amount as that. I know that these computations were made by different people and at different times. I do not know the purposes of the presentation in each case. I understood them both to refer to an allowance for the instruments, and that is the only reason that I have compared them. I looked at the methods and I set up what the methods showed.

[fol. 7463] I think the computation purported to show that one method which I have used here in parallel to the other, was a method that was set up by an officer of the Illinois Bell in 1929 to show what it would cost the Illinois Bell Company to buy these instruments new, and to maintain them in service, and to get a fair return on the capital so invested.

In column 4 "Total Cost of Furnishing Telephone Instruments," I have figured what the return would amount to if the Illinois Bell Telephone Company had gotten an amount of $709,000.

By the use of the figure 64.63, what I tried to do was to work down to a return on investment, assuming that Illinois Bell got $709,000 as an allowance. I understood that there was a claim for an allowance of that amount. The computation of total cost to the Illinois Bell of $709,000, and working out an actual return to the Illinois Bell of $454,990 and a per cent of actual return on net investment to the stockholders of the American Telephone & Telegraph

Company of 64.63 per cent is all based on the American Telephone & Telegraph experience. The amount $454,990 was related to the investment shown in column C of $1,076,383, which is the allocated proportion of the American Telephone & Telegraph Company's investment set up on their books in respect to the Illinois Bell, Chicago Division.

In submitting that percentage of 64.63, all I was trying to show was what an enormous return this amount would be on the basis of the American Telephone & Telegraph Company's actual experience. That is all I was trying to show. The actual experience that I mentioned was that I took their investment as shown on their books and allocated it to Chicago, on the average stations.

If all the company is entitled to in this case is the cost of maintaining these instruments as shown by its experience, then the figure which should be used is $327,965 instead of $709,070, and that's all there is to it. As a matter of fact, in the last column here I purport to show what the actual experience of the American Telephone & Telegraph Company was as I understood Mr. Heiss' exhibits to mean.

"Q. And that is based on instruments that were purchased over a number of years at lower prices than obtained in the years in question, is based upon the deduction [fol. 7464] of a depreciation reserve of 50 per cent which was built up by 10 per cent charges over a number of years prior to 1923, and takes the actual expense that the American Telephone & Telegraph Company incurred in connection with those instruments, that's right, isn't it?

"A. They are all actual items so far as I understood."

I do not understand that this figure of $189,351 in Column B, Exhibit X-115, represents actual depreciation. My recollection of the exhibit was that it meant a deduction of 8 per cent from value new for depreciation. I presume it was for actual depreciation instead of the book reserve for depreciation. There is a difference between columns B and C as to the investment, because they are set up on a different basis. That is due largely to the amount of depreciation which is taken off.

Part of the difference in the two columns is that in one column Mr. Heiss is estimating the figures on the basis of an 8 per cent return, and on the other he is basing it on the actual cost of money to the American Telephone & Telegraph Company. That is not all of the difference between

the two columns. There are differences in the expense items that he included in his allowance.

These two columns B and C down through line 7 in so far as figures are concerned are all shown on Mr. Heiss' exhibit except that in the amount $473,000 I have added back taxes which he omitted. I put the two on the same basis. I think that he understated, a little, the amount that the American Company would have been entitled to on his theory by omitting the taxes.

I have taken the figures, with the exception of the one change we have mentioned, from a comparison which Mr. Heiss himself made.

"Q. And then you have added lines 8 and 9, which he did not use, and then you have added the whole of column A, and you have used your own legend here for lines 1 to 9, inclusive?

"A. Well, line 8, I don't recall that his exhibit exactly showed a line that he called the same as I have called it, but he used that figure of 6.87, that shows in his exhibit."

It appears in line 6. I don't consider "Investment or value new" in line 1 to mean the same thing. I have not shown which was which. The terms "Net investment or [fol. 7465] fair value" I do not consider equivalent the way they are shown here. I have not indicated which of these figures was "fair value" and which was "net investment."

"Q. Anyone looking at the exhibit would understand that the figures were comparative, and were stated on the same basis, would they?

A. I did not intend to convey the idea that each one of these items represented the same thing as the other at all, that they meant the same thing."

In line 8, I figure out what is not the fair return on the value of the property, but the return to the American Company on its investment in the property. In line 9, I step that figure up by finding the per cent actual return on net investment converted to average return to American Telephone & Telegraph Company stockholders in the same manner in which I stepped up the similar figure in Exhibit X-111.

What I did in Exhibit X-117 was to work out the annual allowance of the Public Utility Commission in the

order of December, 1920, to show on the basis of the figures for the year 1920, that is the average stations in service, what the allowance would be at $1.13 per station, and I worked that out, or I compared that figure with what the cost of furnishing the telephone instruments would be, based on the American Telephone & Telegraph Company's actual experience, and including a return on investment at the annual cost of funds. As a final result here, I get a per cent of profit to the American Telephone & Telegraph Company on its average investment of 45.17 per cent, from the order of the Commission. To get "Profit to American Telephone & Telegraph Company, $343,122" in line 4, I took the allowance of the Public Utilities Commission at $1.13 per station and applied that to the average number of stations for the year 1920, then I worked out what the cost of furnishing the telephone instruments would be, which is shown in my Exhibit X-116, based on the experience of the American Telephone & Telegraph Company, including a return on investment. I followed that method throughout all of my calculations, and in all of my exhibits, consistently deducting the entire reserve which the American Company has set up, and I am purporting to figure out a return on the net cost to the American Company, taking what is paid for the property in the first instance, and what it had set up on its books as [fol. 7466] a reserve, deducting the reserve, and getting a balance; that is the figure I use in every case, and that is the figure on which I compute what I call per cent return. I used the same method as Mr. Heiss in Exhibit A-166.

I have presented about eighty or ninety exhibits to this court in the last few days. The calculations are based on what the books show; that is, based on the original cost as I took it from the books, less the depreciation reserve shown on the books. That is the consistent principle I have followed throughout.

On Exhibit X-117, I say "Profit to American Telephone & Telegraph Company." That is the difference between the amount which the Commission said it would be fair for the American Telephone & Telegraph Company to get, and the amount which I figure out it would have cost the American Telephone & Telegraph Company.

In a number of my exhibits, I make a comparison of what I call the return to the American Company from

other associate companies. Whether I use, as the figure of the return, the dividends and interest, depends on what exhibit you are referring to. All of them do not show dividends and interest, but a number of them show dividends and interest. In a great many of them I have lumped together the dividends and interest received by the American Company from the Illinois Bell, and compared those figures with the dividends and interest received by the American Company from other associate companies. My Exhibit X-284 shows both dividends and interest separately. I don't know whether any other exhibit shows both separately. There is at least one that shows both separately. Most of them lump them. In those cases where I have made the comparison of the mixture, as an accountant, I think that that comparison means something.

In my opinion, as an accountant, if I wanted to find out the relative values to the American Telephone & Telegraph Company, and the relative profits to the American Telephone & Telegraph Company from two companies, it would make no difference to me that the moneys received by the American Telephone & Telegraph Company in one case were 99 per cent bond interest, and 1 per cent from stock dividends, and in the other case were 99 per cent [fol. 7467] from dividends, and 1 per cent from bonds. I put the two items together. I think that is clear that I put the stock and the loans together, and I worked out the dividends and the interest on those loans in respect to the Illinois Bell, and I compared the same thing with the other companies.

If the dividend rate were 8 per cent and the interest were 5.88 per cent, under my method, the average return would vary, based on the proportions of the stock and loans. The proportions of stock and loans and the dividend rates are factors that enter into it.

"Q. And in some forty or fifty sheets you have worked out the comparison between what you call the yield to the American Company from the Illinois Bell, and the yield to the American Company from other associate companies on this basis of comparing a mixture of interest and dividends in one company with a mixture of interest and dividends of another company, is that right?

A. The comparisons are the same for the Illinois Bell as compared with the other companies.

Q. And because the Illinois Bell, for special reasons that have been stated here, are paying small amounts in interest, the comparison shows that the return, as you call it, from the Illinois Bell was a little better than it was from some of the other companies, is that right?

A. The return—in the comparison of the Illinois Bell, the returns from the other companies are all based on these factors that I have mentioned a while ago."

What I tried to show in connection with those items is the comparison of the return on the stock and the loans together; in other words, in some companies the American Telephone & Telegraph Company made a large number of loans, made large amounts of loans, in other companies it made small amounts. It got interest on the money which it loaned, and it got from the same company dividends on stock.

As to what relation those two things have to each other in this case, I wanted to show what the total return was on both of these items of investment that the American Telephone & Telegraph Company was getting. Interest on money is what the American Telephone & Telegraph Company received for the money. I did figure dividends on stock. I figured first, the dividends, then, in some other sheets I put the loans together with the stock and showed [fol. 7468] the return on the two items combined. They show on their face that they are made that way.

When I developed these percentage figures that I used by comparing this so-called return with the investment of the American Company, I go away back to the original cost to the American Company of what it paid for the stocks in these various associate companies.

In the case of the Pacific Company, I show the return on the stock for the year 1923 was nothing; the year 1924 was nothing; the year 1925, 6.54; the year 1926, 7.63; the year 1927, 7.39; the year 1928, 7.33; the year 1929, 7.33; the year 1930, 7.19.

This is the return to the American Telephone & Telegraph Company on its investment in the stock of the Pacific Company.

I don't recall any such figure as 100 per cent return from the Pacific Company. If there is any such figure, it strikes me it must be a typographical error. I don't recall any such figure as that. In my comparisons here, I

am dealing with what the books showed to be the American Company's investment in the stock of the associate companies.

In Exhibit X-278, the figures that I develop as the percentage of dividends and undivided profits of licensee companies to investments by American Telephone & Telegraph Companies in common stocks of licensee companies converted into average return to stockholders of American Telephone & Telegraph Company on their investments in capital stock of American Telephone & Telegraph Company for the years 1920 to 1922, inclusive, are as follows for the Pacific Company:

For the year 1920, 118.14 per cent; for the year 1921, 144.59 per cent; for the year 1922, 159.20 per cent; and the year 1923, 118.47 per cent. The next year it goes down to 44 per cent, and after that diminishes. By the method I have followed here, I worked out a return with respect to the Pacific Company as high as 159.20 to the American Telephone & Telegraph Company stockholders, on their proportion of the investment, after considering the dividends and the undivided profits.

In Exhibit X-124, it shows that the Indiana Bell Company paid no dividends at all during 1923, 1924, 1925 and only 4 per cent in 1926; 6½ per cent in 1927; thereafter, 8 per cent.

[fol. 7469] In Exhibit X-130 I show what I call the amount required to equal the average Illinois Bell Telephone Company return on capital stock.

I show those figures for 1923 as $863,796; for 1924, $861,376; 1925, $1,333,986; 1926, $946,185; and 1927, $322,751. This exhibit merely is to show how much it would be in terms of dollars that the Indiana Bell would have to pay to the American Telephone & Telegraph Company on its investment in the stock of the Indiana Bell, if it were on the same basis as the Illinois Bell. I use that information in X-137, and there the above amounts are raised to include loans, and the total equalizing figure for stocks and loans is for 1923, $1,111,829; for 1924, $1,134,571; for 1925, $1,555,573; and for 1926, $1,010,741; and for 1927, $409,027. They purport to show the amount that would be required to equal the average return of the Illinois Bell to the American Telephone & Telegraph Company on the American Telephone & Telegraph Company's investment in stock and loans of the Illinois Bell.

The exhibit shows that the Illinois Bell was doing so much better than the Indiana Bell that the Indiana Bell would have had to pay to the American Company these amounts that were read off last in order to equalize its payments to those of the Illinois Company.

In Exhibit X-142, I show the license revenue from the Indiana Bell Company to the American Company. That starts out at $363,065 in 1923, and increases to $464,987 in 1927. I then deduct from these amounts the stock and loan deficiency which was just read and I do that to place the company on an investment basis comparable to the Illinois Bell Company.

What I meant by that was this: in connection with the license contract there were certain losses on the loans, and there were certain losses on holding funds available for stocks and loans. Now, what I did here was to put this item in to show if all the companies were on the same basis as to return as well as to losses, that that is what it would result in. That is a comparative figure only. I put it in there to show what it would be if they were all on the same basis. I thought it would illustrate the inequality of the financing between the companies. They were all gone over by attor-
[fol. 7470] neys.

All of these figures that I have used here, and all of this approach that has been spoken of, leads up to the fact that because the Indiana Company and some of the other companies were not doing very well in these early years, that the amount of license contract payment from the Illinois Bell to the American Company should be reduced or that the license payments of the other companies should be increased.

"Mr. Blackman: Yes, that is working it out on your last, according to the argument which underlies this long list of papers, we should have charged the Indiana Bell Company 18 per cent as its license contract payment in these years in question."

(Objected to by defendants.)

It figures out about 18 or 19 per cent.

Referring to my testimony on re-direct examination in which I said that the company that had a thousand dollars of capital and nine thousand of stock premiums would earn 80 per cent, based on what I said was the American Com-

pany's method, the figure 80 per cent was based on what I understood your assumption to be and that was on a thousand dollar stock, nine thousand in premiums, and a total of ten thousand dollars, and an 8 per cent return. That is what I considered it, an 8 per cent return on the full amount of the investment, that is how I figured out the 80 per cent.

"Q. Do you mean to say that after going over that for a day yesterday, you considered that the return was eight hundred dollars, and not eighty dollars?

A. I understood when you first questioned me about it that you were talking about an 8 per cent return, so I was confused as to what per cent return you were referring to. If you figure 8 per cent return on ten thousand dollars, you get $800, which is 80 per cent on the capital stock of a thousand dollars, and that is what my computation was.

Q. Do I have to go over this again?

A. That is what I meant.

Q. Do you mean now to say that in answering the questions that I put to you yesterday, that you were considering that the return was eight hundred dollars, and not eighty?

A. I was confused——

[fol. 7471] Q. No, answer that, please?

A. That is what I had in mind, 8 per cent return."

If we have a company with ten thousand dollars, which it has invested, one thousand of that is the par value of its stock, and nine thousand of that is stock premiums, and it is earning eighty dollars a year, if I worked it out in the same way that I worked out the figures on X-111, the per cent of rate of return to the stockholder of that company on his stock investment would be 8 per cent.

Tying this illustration up with X-108, what you have given me would amount to an .8 per cent return on an investment, and the cost of funds would also be .8 per cent, and using the exact method that I followed, the figure that would compare with the dividend rate in the last column of X-108 on the thousand would be 8 per cent and that would be what my method would work out, it would work out to 8 per cent on a .8 per cent return, but on an 8 per cent return, it would be 80 per cent.

"Q. Well, now, I am asking you to assume an 8 per cent return to the company on its stock, and tell me how much return to its stockholders, that would mean, figured in the

way you figured X-111, to get the figure of 59 plus per cent?

A. An 8 per cent return on a company with a stock of a thousand dollars, premiums of nine thousand, total funds in the business, ten thousand, 8 per cent return on that, $800, would figure 80 per cent return to the stock."

That would be on the par value of the stock, without considering the premiums. But if you consider the premiums, then, on the illustration you have given me it would be 8 per cent, which is the same figure as the return on investment.

There would not be any change in the percentage if there were no change in the earnings, but if you combine your stock and your premiums together, when you put in more premiums of course you are going to reduce your return, but if you do not change your earnings, and you will take the same stock, you are not going to change your per cent on the stock itself, on the par value of the stock.

As to whether my method inevitably results in figuring out a larger profit to the stockholder from the same identical return, the greater the amount he has paid for his stock, if he pays it to the Company, I don't know what you mean [fol. 7472] by "return." That is where I get confused, because you don't tell me what return you are relating it to. I will admit that I was confused in the way you put some of the questions to me yesterday, but I know that my method is right, and that it gives me the right answer.

I understand that the American Company uses a method by which I could figure out an 80 per cent return in the case that was given. As to what the American Company does to justify my method, I worked out a per cent of return on the par value of the stock, and that is what the American Company does in its annual reports to the stockholders, and in the Bell Securities Manual it shows the return on the stock, and that is what I have tried to work out on their figures, the return on the par value of the stock, without considering premiums and the surplus. I told you this morning that in some of my other exhibits I have showed it on both bases, on the par and also on the par, premiums, and surplus.

The things I refer to as justification for this are:

The Bell Telephone Securities Manual for the year 1931, page 10, shows $10.44 net earnings per share on the stock. That is $10.44 per share on the par value of the common stock, and that is what I have used in all my figures. They

are identical. As to whether there is anything else justifying my procedure, there may be other places where the American Company referred to the par value of the stock; I don't know. But I know that when they speak of the earnings, they refer to the earnings on the par value of the stock, and what I have worked out is in relation to the par value of the stock. That is what I had in mind when I answered Mr. Goldstein that the third method that I mentioned was the American Company method.

Yesterday you asked me to add five million dollars to the capital stock premium figure, which appears on page 4 of X-108. You asked me to add a billion dollars to the surplus that appeared on page 4 of X-108. I don't recall that you were trying to work out a new conversion figure on X-111. I certainly didn't understand that. I remember working out a calculation, but I don't remember all the details of that calculation. The record will show. I remember I worked out a figure—I think it was 140 per cent. I don't recall the exact figure. If it was based on X-111, why, [fol. 7473] that it what the calculation was. I don't recall all the details of it. I do recall that I made a calculation, but I had not recalled what particular exhibit was referred to yesterday. It was the return as expressed on the par value of the stock. I can't recall all the details of the calculation now.

There are a lot of calculations will have to be made to add $500,000,000 to the capital stock premiums shown on page 4 of X-108. I have not the paper that I made the calculations on yesterday. I must have destroyed it. I haven't it now. I just may have misplaced the paper. I haven't it now. The record shows that I said "Based on the assumptions you have made, it becomes 140.77 per cent."

I computed it hurriedly, and I am not absolutely sure that making the assumptions Mr. Blackman asked me to make, by adding the amounts in the exhibit, making the computations according to my method, that it is the correct percentage.

I now seem to get the same figure of 140.7 per cent, but I would like to have the opportunity to study the figure and study the method; if I have worked it out wrong, I am perfectly willing to rectify it. (It was agreed that the figure would stand unless corrected later.)

As to why that figure went up, I would like to study the method and study the figure, and see if it is right, and

if I am not right on it, I would like the opportunity to correct it. It may be that this method would cause the figure to go up if you increased either the capital stock premiums or the surplus. It seems to be true that if you increase either the capital stock premiums or the surplus on my Exhibit X-108, and followed through the method that I have adopted with regard to X-111, that the percentage figure on X-111 would have to go up.

All I would like to do on this would be to study my method and see if I have computed it correctly, and if it is not computed correctly, why, I am perfectly willing to correct whatever error there is in it. That figure would have to go up, following the method that I followed, if you increase either the stock premiums or the surplus.

It seems to me there is one fallacy in the statement of counsel that under my method, as shown on X-111, the [fol. 7474] larger the amount the stockholder pays directly to the corporation for his stock, the larger will be his return, on the same dollar dividend. This fallacy is that, this figure of investment is related to a figure that I have shown on my X-111. Now, what you are doing when you put in these capital stock premiums is changing the relationship of the investment figures. It seems to me that is what you are doing. It produces a different answer, according to the calculations that I have made here.

I am to be understood as saying that if I apply my method on the assumption that counsel has made, it will produce the result of increasing the percentage. As an accountant, I can think of circumstances that would prevent this result from following, that is, if you change the other factors; if you change earnings and those other factors that enter into return on investment. Everything remaining constant except the variables, surplus and premiums, I cannot think of any conditions which will not produce the result of increasing the percentage, if you increased those variables.

Re-redirect examination.

By Mr. Goldstein:

"Mr. Goldstein: I direct your attention to the following statement in the Bell Telephone Securities Manual for 1930, for the use of investors, investment houses and bankers, with a brief introductory statement of the organization and financing of the American Telephone & Telegraph Company and Associated Companies, which reads:

'Financial Policy. The policy of the American Telephone & Telegraph Company set forth in a recent Annual Report follows:

'The American Telephone & Telegraph Company accepts its responsibility for a nation-wide telephone service as a public trust.'

'Earnings must, of course, be sufficient to permit the best possible telephone service at all times and to provide a reasonable payment to stockholders with an adequate margin to insure financial safety. Earnings in excess of these requirements will either be spent for the enlargement and improvement of the service furnished, or the rates charged for the service reduced. This is fundamental in the policy of the management.' "

[fol. 7475] The Witness (continues): I thought that my method would get the exact measurement of the amount of the dividends and the amount of earnings over and above that, so that I could compute the margin to insure the financial safety, but I want to check up on the method and if it is wrong, I will be perfectly willing to rectify it.

The net earnings per share of the American Telephone & Telegraph Company stock, available for dividends, which is shown on sheet 10 is the same identical document which shows the $10.44 which I used in my exhibits.

. . . . . .

[fol. 7476] CHARLES R. WHITWORTH, called as a witness on behalf of the defendants, having been first duly sworn, testified as follows:

Direct examination.

By Mr. Haight:

June 18, 1932.

My name is Charles R. Whitworth. I reside at Highland Park, Illinois. My occupation is certified public accountant with Touche, Niven & Company. I have been with that company 19 years. Before that I was with Price, Waterhouse & Company for seven years, and prior to that I was six years in London, England, in the same line of work. I am resident partner of the Chicago office. I have personally been in charge of general audits and examination of books, records and accounts of manufacturing, mercantile and

banking concerns. I am engaged in work of that sort at the present time.

In connection with my work, I have on behalf of my firm issued auditors' certificates covering the findings of my company as a result of our examinations of the books of such companies, with respect to their profits and their assets. I was here when Mr. Hagberg testified as to the operations of Touche, Niven & Company; I heard his testimony. He stated correctly the nature of those operations,—the extent of the operations, and the character of the work done by Touche, Niven & Company.

I am a member of the American Institute of Accountants, New York Society of C. P. A.'s, Illinois Society of C. P. A.'s and the Institute of Chartered Accountants of England and Wales.

In order to make an auditor's certificate covering the subject matter of their examination relative to profit and return on investment, it is generally customary for an auditor to be given free access to all books and records, including the corporate minute books and all correspondence with the Internal Revenue Department, so that he may make an unrestricted examination of the affairs in order to determine that the books and accounts are correctly kept, and that all [fol. 7477] of the transactions of the company are recorded therein; and also to enable him to get the characterization of the transactions whose figures are recorded in the books of account.

There is a practice among accountants, in regard to the breadth of opportunity that is given an accountant in making an examination of the character that we have been describing. If we go into a bank or a business place, for example, we are allowed to examine whatever we ask to see. We tell them we want all of the books of account and we expect them to bring them to us. We do not go looking for them around the premises, but we probably would look to see if there was a complete set of books furnished to us. We would ask them whether that was all.

After we go in and ask them if they have a private ledger, that is as far as we go. We would not necessarily start a physical search of the premises to see whether there was a private ledger or not.

In order to certify to the correctness of accounts, it is necessary to examine all of the books and all of the documents that may be necessary, in order that we may satisfy

ourselves that we have all of the information necessary for us to have.

I have met Mr. Gregory, comptroller of the Western Electric company. My first meeting with him was on December 28, 1931, in his office at 195 Broadway, New York. There was present Mr. J. G. Wray I think, and probably Mr. McCann. Mr. J. G. Wray is one of the engineers employed by the City of Chicago in the present case. I had a conversation with Mr. Gregory at that time with regard to the examination to be made of the Western Electric Company's books and accounts.

I told Mr. Gregory that Touche, Niven & Company had been employed on behalf of the City of Chicago to make a general investigation of the records of the Western Electric Company to determine its profits and return on investment for the years 1916 to 1930.

Mr. Gregory stated that he would be very glad to cooperate with us, provided we stated in writing the specific books and records we desired to see, and the nature of the [fol. 7478] information that we wished the Western Electric Company to supply, and that such request would be taken under advisement by the Western Electric Company and its counsel, and that we would be informed of the decision. The personnel of our organization was also advised of this information.

These inquiries into the affairs of the Western Electric Company and the American Telephone & Telegraph Company, in so far as Touche, Niven & Company are concerned, were in charge of Mr. McCann under my supervision, in New York, and Mr. Hagberg, in Chicago.

The work was under my general direction. I prepared a statement regarding the men who were employed and the time put in up to and including May 31st. I have it here.

(Said document was marked Defendant's Exhibit X-309, entitled, "Summary of Time by Hours, Touche, Niven & Co.")

Some of the men were working in both New York and Chicago; there were some Chicago men working in New York, and Mr. McCann from our New York office was working here in Chicago. This listing then simply indicates the exact number of hours of Touche, Niven & Company with whom they are associated.

This conversation with Mr. Gregory was on December 28, 1931.

Cross-examination.

By Mr. Thompson:

I have produced in court an instrument which is identified as Exhibit X-309, which shows the total number of hours spent by Touche, Niven in doing work in this case, of 7,465 hours. Practically all of it was spent examining the books of the Western Electric Company and its subsidiaries, or making the figures taken from those books. I should think that more than half of it was spent in examining the books themselves. More than one year's time of one man was spent in a direct examination of the books of the Western Electric Company and its subsidiaries, that were turned over to us for inspection.

I cannot say exactly when Exhibit X-79 was first pre- [fol. 7479] pared. I cannot answer when I first saw it. I would say some time in the early part of the year probably January, 1932. I do not know that it was submitted to me so that I could pass upon the question of whether Mr. McCann would testify to that sheet. I saw the exhibit, but it was not submitted to me for any particular purpose, except that they were all going to be used for this examination. I approved a great many exhibits; I do not know whether I approved this one or not.

"Q. Well, look at it now and see whether you approve of it?

A. What do you mean by that?

Q. Whether you think that is a fair statement of the facts.

A. In what respect?

Q. Just look at the exhibit; in any respect appearing on the exhibit.

Judge Wilkerson: May I see it?

The Witness: The exhibit speaks for itself.

Mr. Thompson: I see. You do not care to look at it further, or to say whether this exhibit which has been put in by one of your employes fairly represents, in your opinion, the facts in this case?

A. I repeat that the exhibit speaks for itself.

Mr. Thompson: Will you read the question to the witness, please, Mr. Reporter?

Q. (Read by the reporter.)

The Witness: I am ready to answer any questions that they want to ask about it.

Mr. Thompson: Your Honor, I think I am entitled to an answer to that question. It is a very simple and plain question.

Judge Wilkerson: Well, he has answered it, has he not?

Mr. Thompson: Sir?

Judge Wilkerson: He has answered it, has he not? What was the question you asked him?

Mr. Thompson: Read the question again.

Q. (Again read by the reporter.)

A. I have already answered, that the exhibit speaks for itself, but I am further willing to give any further information that I may have in that connection."

(Plaintiff's Exhibits A-222 and A-223 were marked for identification.)

[fol. 7480] (It was agreed that Plaintiff's Exhibit A-222, which purports to show documents submitted to Touche, Niven & Company for examination in New York, from March 29, 1932, to May 9, 1932, and Exhibit A-223, which purports to show documents submitted to Touche, Niven & Company at Chicago from February 29, 1932, to June 13, 1932, both supplemental to the list contained in Plaintiff's Exhibit A-73, are correct.)

My conversation with Mr. Gregory was on December 28, 1931. Mr. Gregory, did not, to my knowledge, say that there were cases pending in a number of other jurisdictions, where the Western Electric Company was being required to furnish a large amount of information for courts and commissions. I knew that was a fact. I knew that there was then pending a case before a master in the Federal Court in Michigan, involving the reasonableness of the Western Electric prices. I knew that there was then pending a case before a master in the Federal Court at San Antonio, involving the same question.

I knew that there was then pending an investigation before the Public Service Commission in Ohio involving the same question. I knew that this case was then pending, also an investigation before the Public Service Commission of Wisconsin.

Mr. Gregory said that the practice was to make the request in writing. I made no protest or objection to that at all. I think I said to him, "That is satisfactory to me." I am not making any protest about it now.

Exhibit X-79 relates itself wholly to its consideration of the Electric Research Products, Inc., and the investment of the Western Electric Company in that corporation.

There is no information which appears on that sheet other than information or data relating to Electrical Research Products Inc., and the Western Electric Company's investment in that corporation. For the preparation of that exhibit, or for a knowledge of the facts in connection with it, all that I needed was the books of Electrical Research Products, and the books of the Western so far as the investment in Electrical Research Products by the Western Electric was concerned.

[fol. 7481] It is not entirely correct to say that when we started out, it was merely to ask the Western Electric Company to allow us to inspect its books and records, but to prepare statements for us.

It is true, that time and time and time again in this correspondence, what we did was to request the Western Electric Company to prepare a statement which we wanted, that required work to be done by the Western Electric Company. We also asked them to see the books in several instances, in connection with our studies.

I recognize a letter that I wrote to the Western Electric Company on January 12, 1932.

(Letter marked Plaintiff's Exhibit A-224 for identification.)

I dictated the letter and signed it personally.

(Carbon copy of letter marked Plaintiff's Exhibit A-225, for identification.)

I received the original, of which Exhibit A-225 is a carbon copy, which letter contains the following:

"It is understood that the books of Electrical Research Products, Inc., are open for your examination," and I do not know and I cannot answer whether, pursuant to that letter, all of the books of Electrical Research Products, Inc., were offered to us for our inspection and examination by the Western Electric Company and the Electrical Research Products Company. I have nothing personal with it,—beyond super-

vising,—I have not seen the books of Electrical Research Products myself at all. I had charge of this investigation.

Mr. McCann will have to state to the court, with respect to Exhibit X-79, what information we applied to the Western Electric Company for, in connection with that exhibit that was denied to us. He applied for the books, and he was instructed to see them. We have a list of the things that were denied. I do not have it with me; it is in the correspondence which Mr. Haight has.

To name the things denied us, I will have to get the correspondence, and show you the list that Mr. McCann has prepared. There are several of them. I cannot name one of them; Mr. McCann will present that.

Exhibit X-79 purports to show per cent return in one year, [fol. 7482] 1929, of 309.4 per cent. It states what the investment was based on. I do not know what it was based on beyond what it says on the exhibit. I would have to refer to the working papers again.

Statements are sometimes prepared showing the per cent of return which the Company was making on the original dollars invested in the business, excluding the earnings and surplus. I could not say whether I ever did it. I would have to get that information. Whether Exhibit X-79 takes into consideration the loans made by Electrical Research Products from the Western Electric Company, and used in the business I can find that out from the working papers. I cannot say without referring to those papers. I have seen the papers, but I would not answer that question directly, offhand.

The capital invested in the foreign business is included in the statement of profits made by Electrical Research Products, Inc., on its foreign business. I would have to get the papers to tell whether in arriving at the figure of 309.4 per cent in Exhibit X-79 the capital invested in the foreign business is included. I do not know without looking at the papers. I knew that this exhibit was to be offered in evidence in court. I did not know the purpose; the only purpose I knew, was to show the return. I did not know what figures would be produced. I have seen the exhibit several times.

"Q. Now, I want to ask you whether in your opinion it requires more information to enable you to certify to the statement—or the balance sheet of an industrial or manu-

facturing corporation, so that that sheet may go out and be used in the sale of the stock and bonds of the company, than it does to support sworn testimony on the witness stand, as to the facts?

Mr. Haight: I think that is an objectionable question.

Mr. Thompson: I think it is perfectly proper.

Judge Wilkerson: What is that question? I did not get it.

Mr. Thompson: Read the question, please.

Q. (Read by the reporter.)

Judge Wilkerson: I think that is a fair question, for the representative of an accounting firm. I will put it this way, if I may——

[fol. 7483] Mr. Thompson: Certainly.

Judge Wilkerson: If I may change your question.

Mr. Thompson: Certainly, your Honor.

Judge Wilkerson: Although perhaps I will not do as good a job as you, but I think this is what you would like to know about in connection with this exhibit. Now, we are getting at the practice, not the general practice among accountants, but the practice of your firm. Here is a statement, which you knew was to be offered in court, and was to come before the court, and three judges were to be asked to make a finding of the return based upon the percentages which you had estimated. You knew that; that is, you knew that that use was to be made of it.

The Witness: Yes.

Judge Wilkerson: You knew we were to be asked to adopt those percentages as indicating the return of the Electrical Research Products Company.

Now, just what is your practice, your general practice, where you are confronted with a situation of that kind, and you are denied access to some essential document, or some essential book? Is it your practice to make up papers from those books to which you have access, and send them in, or is it your practice to advise the court that you have not the necessary papers upon which to make an estimate?

The Witness: It is generally necessary to advise the court that we have not the necessary facts.

Judge Wilkerson: So you had everything which in your opinion you thought was necessary to the ascertainment of these percentages, or you would have told the court that you did not have the documents, or the books from which to make them, would you not?

The Witness: Yes, sir.

Judge Wilkerson: All right; go on."

During the course of the examination which you were making of the Western Electric Company's books and records, we were giving some information to Mr. Goldstein ourselves. I suppose it was also coming directly from the Western Electric Company to Mr. Goldstein, as I was getting it. I knew we were not the only source through which information and examination of the Western Electric Company's books and records was being made by the City of Chicago.

[fol. 7484] First there was our firm, and we were operating both in New York and Chicago. And then there was Mr. Goldstein, who was to our knowledge writing many letters all the time about this question. The firm of James G. Wray also got information from the Western Electric Company during this period; also the Illinois Commerce Commission. There were four sources through which information was being obtained from the Western Electric Company.

Redirect examination.

By Mr. Haight.

When I said that men were employed in working upon these books for more than a year's time, I meant one man, more than one year, but actually we have had many men who have been engaged on and off since last December. On a seven-hour day that would amount to about three years for one man.

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[fol. 7485] George B. McCann, a witness on behalf of the defendants, having been previously duly sworn, resumed the stand, and testified further as follows:

Direct examination.

By Mr. Haight:

June 18, 1932.

I have made several requests in writing of the Western Electric Company for information. I have certain of the copies of these written requests. The first one is a letter of January 12, 1932, addressed to Mr. Gregory. I received an

[fol. 7486] answer to item 4, on the letter of Jan. 12, 1932, but it was not the information that was requested at the time.

Item 4 is entitled "Basis of Profits on Deferred Payments on Installment Sales, i. e., a description of deferred receivables." Under date of January 13, Mr. Gregory replied stating that he would furnish us with the information. Under date of January 19, 1932, we received a further reply from Mr. Gregory, who furnished us at that time, in answer to item 4, a statement showing by years analysis of deferred receivables on monthly report number 1. This was not the information that we requested under date of January 12th. We asked for a description of deferred receivables. We desired to know the basis upon which the Electrical Research Products, Inc. took up its profit on deferred payments on installment sales. Instead, the company furnished us with an analysis of receivables at the end of each year, which was simply a statement of the name of the particular customer, and the amount outstanding at the end of the year.

The next request is dated February 3, 1932. It is a written request in this file of documents that has been marked for identification Defendants' Exhibit X-311, entitled "Correspondence re requests (McCann) including letters of Jan. 12, Jan. 13, Jan. 19, Feb. 3, Feb. 8, Feb. 9, Feb. 11, Feb. 26, Feb. 26, Mar. 8, April 21, May 5, May 6, May 6, Feb. 4, Feb. 8, Feb. 8, Feb. 27, Feb. 15, 1932 (Touche, Niven & Co.)." There are two items here that were not answered, or were not answered in the manner in which asked. The first item appears as item 3 of that letter, asking for plant appropriation, years 1924 to 1930, inclusive. The second item was item 8, amount receivable by years on unexpired license contracts of Electrical Research Products, Inc., as of December 31, 1930, together with probable cost of servicing such contracts.

Item 3, plant appropriation, years 1924 to 1930 could have been used to ascertain the following information: first, they serve as a check against plant additions as shown by the books, to determine whether all expenditures for plant have been properly capitalized, or any portion thereof charged to expense.

Second. They disclose the purpose for which the new plant is being built, and thereby reveal the character of [fol. 7487] plant as between one class of business or another, and as between Bell or non-Bell business.

Third. They disclose whether the new plant is being constructed to replace existing plant, and thereby serve as a check against the plant requirements, as shown by the books.

Fourth: They disclose whether the new plant is for future development, or for presently used and useful property.

I received two replies in writing to that request. Under date of February 9th, the company advised me with respect to this item: "We will advise you later with respect to this request." Under date of February 11th, the company stated, "We decline to furnish for examination data with respect to plant appropriations, years 1924 to 1930, inclusive." I am reading from letters that I received and that are in this exhibit.

The last quotation was from letter of February 11th, from the Western Electric Company, signed by Mr. Gregory, comptroller. I have not had any of that information.

In respect to item 8 of that request, a letter received from Western Electric Company under date of February 26th shows the complete interchange of correspondence relating to this particular item. The final answer of the Western Electric Company is contained in the last paragraph of that letter, which states, "We have no information, and we do not propose to make any estimates, of either (1) the revenue which will be derived in subsequent years from the contracts in force on December 31, '30, or, (2) the probable cost to Electrical Research Products, Inc. of furnishing the service required under the contracts referred to."

The next item is a letter dated March 8, addressed to Mr. R. H. Gregory. That letter asks for six items. I did not receive item 1 and item 5. Item 1 was a copy of the option agreement. Item 5 is correspondence with and statements showing findings of the Internal Revenue Department relative to federal income taxes of the Western Electric Company and its subsidiaries for the years 1924 to '30, inclusive.

If the information had been made available to me, I would have used it for the following purposes:

[fol. 7488] 1. To determine whether there was any additional liability on the part of the company for federal income taxes for prior years.

2. To determine whether there was any refund due to the corporation on account of taxes paid in prior years.

3. The findings of the Internal Revenue Department may disclose transactions of a special character which are not otherwise brought to the attention of the auditor.

4. The findings frequently disclose the manner in which profit is taken up by the corporation on installment or deferred payment sales, and gives the auditor a base from which to form his own opinion.

5. The findings also frequently disclose the manner in which a corporation treats items of a capital nature, such as plant additions and patents.

6. The findings also disclose any items of expense disallowed by the Internal Revenue Department. The importance of this disclosure is that it brings the items to the attention of the auditor, and thus gives him the opportunity to pass his own judgment upon them.

The next document in this exhibit is a letter to the Western Electric of April 21, 1932, as follows:

"Will you kindly make available for our examination the working papers showing detail by years underlying Defendants' Exhibit D-61, entitled 'Analysis of profits on business other than with Bell Telephone Company from 1881 to 1927, inclusive.'"

I received a reply to that under date of May 5, 1932. I was furnished with a statement showing analysis by years of the profits shown by Exhibit D-61. This was not the information that we requested. We requested the working papers underlying the exhibit, not an analysis by years. The working papers of Exhibit D-61 might have been used for two purposes—to determine (1) the extent to which the non-Bell profits remained in the business to the opening date of Mr. Gregory's Exhibit A-79, referring to non-Bell assets and (2), the extent to which the non-Bell profits of the Western Electric Company contributed toward the amount received by the A. T. & T. in 1920, from the retirement of 146,050 shares of preferred stock which the A. T. & T. received in 1915.

[fol. 7489] The shares referred to represent the preferred stock which was received in 1915, together with an equal number of common shares in exchange for the common stock of the Western Electric which the A. T. & T. then held.

There was no reply by me in writing to the letter of May

5th, 1932. I called Mr. Gregory on the telephone in the afternoon of May 6th, and he informed me at that time that the working papers underlying Exhibit D-61 would be furnished in Chicago if counsel approved.

The next item in this exhibit is a letter dated February 4, 1932, addressed to American Telephone & Telegraph Company as follows:

"We have been requested by Mr. Goldstein to obtain from you a statement showing details of all rate increases and revenues received therefrom in towns of over 25,000 by companies for the years 1923 to 1930, inclusive."

We received a reply from the American Telephone & Telegraph Company under date of February 8, 1932, signed by Mr. C. A. Heiss, comptroller, in which he states, in part: "I have referred this request to our legal department, who advise that this request should be declined."

I do not know anything further about that. The next item in my exhibit is a letter dated February 8, 1932, addressed to the American Telephone & Telegraph Company.

Item 2 and item 8, in that letter I did not receive. Item 2 is Executive committee authorizations for allotments, stock, loans and so forth, years 1920 to 1930, inclusive, and Item 8 is investment in stock of Western Electric Company, showing acquisition by number of shares, and cost, from January 1, 1906 to December 31, 1915.

Under date of February 27, we received a reply from the American Telephone & Telegraph Company, signed by Mr. C. A. Heiss, as comptroller, the next document in this exhibit. The answer to question 2 is "The Attorneys for the City of Chicago are familiar with this company's position regarding the furnishing of proceedings of our Executive Committee."

The answer to item 8 reads in part, "We are not furnishing data for predecessor company covering period 1906 to 1915." Without the information as to the cost of the Western Electric stock acquired by the American Telephone [fol. 7490] & Telegraph Company prior to 1915, we are unable to substantiate the cost to the American Telephone & Telegraph Company of its stock investment in the Western Electric Company as of December 31, 1915.

(Defendants' Exhibit X-311 and Defendants' Exhibit X-305 and X-306 identified by Miss Galster, offered and received in evidence.)

(Plaintiff's Exhibits A-220 to A-221 identified by Miss Galster on cross-examination, offered and received in evidence.)

Cross-examination.

By Mr. Thompson:

I have now stated all the information that has been in any way denied and of which I now complain. This is the complete story.

With respect to the letter of January 12, 1932, the fourth specification "Basis of profit on deferred payments on installment sales, that is, a description of deferred receivables" I was not seeking by that request the amount of profits on deferred receivables. I was simply seeking the basis upon which they were handled by the Electrical Research Products. I should say that the request was made by myself and by counsel jointly. That is, we did want the information on Electrical Research Products.

"Q. When you made the request, did you know that Mr. John E. Otterson, the president of the Electrical Research Products, had testified in a deposition for and on behalf of the defendants, in either late December or early January, as to the exact basis of profit of Electrical Research Products on deferred payments?

A. I knew he had testified but I was not familiar with what he had testified to."

I saw an abstract of Mr. Otterson's testimony. Whether I saw it before or after the date of this request I don't know. I received so many things that I couldn't say whether it was before or after.

I have received so many things that it is difficult to pin down to one particular item. As to whether I have been in any way hampered in my work by failing to know the basis of profit on deferred payments on the installment sales, of the Electrical Research Products, I think it is obvious, if I ask a question, I have a certain purpose. I wanted to know the facts, I wanted to get it in writing from [fol. 7491] the company. I did not have it directly as such under oath from the president of the Electrical Research Products. I mean, I don't know whether I had that testimony, or abstract, at the time I wrote this letter, or not.

I am not familiar with the questions that Mr. Goldstein

put to Mr. Otterson. It might be said with respect to this particular item that I was seeking to get the information without respect to whether it had been obtained through other sources. I can't say whether I requested a great many things that were duplications. I tried, in so far as possible, to get answers from the accounting executives.

"Q. I see. Your proposition was that, although the information had been furnished thru the legal department of the plaintiff, that what you wanted also was to get the same information from the accounting department, is that correct?

A. I was making an independent investigation."

I was not familiar with everything that had been furnished through the legal department.

I wouldn't say I was doing the whole thing over. I may have overlapped on certain items.

Our request letter of February 4, 1930, in X-311 reads as follows:

"We have been requested by Mr. Goldstein to obtain from you a statement showing details of all rate increases and the revenue received therefrom in towns of over 25,000, by companies, for the years '23 to '30, inclusive."

That request was denied.

This has no relation to X-79 whatever. I did not ask the American Telephone & Telegraph Company to give me access to the records which show this. I wanted them to get up a statement showing the details of all rate increases "And the revenue received therefrom in every town over 25,000, throughout the United States, by companies, for the years 1923 to 1930." I didn't know when I made this inquiry whether it would be given to me.

I am not familiar with rate schedules.

(Rate schedule, for the town of Peoria, Illinois, taken from the file of the Illinois Bell Telephone Company, marked as Plaintiff's Exhibit A-226.)

There appears to be forty-five different rates for exchange service only on that rate schedule. I don't know [fol. 7492] whether the inquiry was or was not limited to exchange rates. I made it at the request of counsel. I think the letter speaks for itself.

I had no idea what would be furnished or whether there

would be furnished, if this request was complied with, not only the exchange schedule of every city of over 25,000 people throughout the United States for this eight or nine-year period, but also the toll schedules.

I don't know how many towns in the United States there are with over 25,000 population served by the American Telephone & Telegraph Company and its subsidiaries. I don't know whether it is over three hundred.

I have already stated that I made the request at the request of counsel.

I didn't know whether the request would be refused. I made it because I was asked to make it. Mr. Goldstein did not say to me what his purpose was in making this request. I didn't know whether to get the revenue received therefrom, would require a regrade study. I am not familiar with it. I do not know now. I do not know it to be a fact that when you attempt to get the revenue received from increased rates, that there is regrading, that is, that subscribers go from one service, where the rate is increased, to a lower grade of service, and that it would have required a study of weeks in each of those exchanges to have furnished the information.

I do not know about rate schedules or increased rates, or what they have to do to find out how much revenue comes from increased rates. I am not familiar with any of that at all. I am not familiar with telephone accounting at all. Mr. Goldstein did not tell me why he wanted this information.

The request did not appear so ridiculous to me that I did not want to make it in this letter, and sign Touche, Niven's name to the letter, with the statement that I had been requested by Mr. Goldstein. The reason I wrote that letter in that particular fashion was because I personally did not want the information. I did not know what is was to be used for. I had no knowledge of how much was to be furnished or whether it would be furnished.

As to No. 8 of the letter of February 3d, "Amount re-
[fol. 7493] ceived by years on unexpired license contracts of Electrical Research Products, Inc. as of December 31, 1930, together with the probable cost of servicing such contracts" I don't recall whether I had some conversation with Mr. Gregory about this request. I believe that these are the servicing contracts on moving picture reproduction ma-

chines that are in theaters scattered throughout the United States. It is not a deferred receivable item at all.

The conversation with Mr. Gregory was substantially as follows: I went to Mr. Gregory and said "I have a request here," and Mr. Gregory looked at the request and said, "There are three things about that that make it impossible for us to do it. The first is, these contracts run for ten years in the future, some of them, and we don't know the payments that will be made under them by these moving picture theaters. Second, we, of course, don't know the probable cost of servicing in the future, because the expense incident to it may change. Third, we don't know how many of these theaters will be in existence during the unexpired life of these contracts," and that under the circumstances, it was impossible to make such an estimate; that if it were made, it would be a mere guess, and worthless. I don't know that I made any statement as to whether I agreed or disagreed with him. There was no reason to protest. He stated his position, and the matter was dropped. I said to him I could not see any relevancy that this request had to anything in this case, so far as my figures were concerned. What counsel wanted to make of it, I didn't know. I don't know whether I agreed with him, either by direct statement or by implication, that when the statement was prepared, it would not mean anything. I don't deny that the conversation took place. I don't think that it is, strictly speaking, an accounting matter. I wouldn't say that from the standpoint of dealing with the facts and the figures, a statement of that kind, if it were prepared, would mean nothing. It would give some estimate of what the future earnings on those contracts would be. I could not make that guess, just as well as anyone else. What I expected was an accounting officer of the Western Electric who was familiar with the conditions, to make that guess for me. The number of these theaters to be in existence during this ten-year period, would be in-
[fol. 7494] volved in it. He has past experience to go by, as to what the cost of servicing would be, eight and nine and ten years from the time he was making the estimate. The cost of servicing was involved in it. I don't know whether the prices the Western would charge in the future would be involved in it or not. I have testified about the refusal of the Western Electric Company to furnish plant appropriations. I don't know that they were estimates made by the Board of Directors of what will be required during the

current year for plant requirements. I never saw them. I said what plant appropriations in general could be used for. I didn't say what the plant appropriations of the Western Electric would show. I do not know what they show. I never saw them.

The information on Exhibit A-227 was furnished to the defendants in this case by the Western Electric Company. I don't know when. I don't know whether it was furnished at the time I made the request for these plant appropriations. It was not furnished directly to me. I received it sometime subsequently. I saw it long before I prepared the exhibits which I put in in this case. That statement shows by each of the years 1916 to 1930, the net increase in plant divided between land, buildings, service, equipment, machinery and small tools, and furniture and fixtures, and the total. I believe that it gives the opening entry as of December 31, 1915, and the closing entry as of December 31, 1930.

We made no request of the Western Electric Company to examine their books as to what actually had been done about additions to plant in any way. The only request is the one referring to appropriations. In other words, I had a statement made up by the Western Electric Company that showed, by accounts, for each of the years involved in this inquiry, the additions that had been made to plant, but I wouldn't say that I had free access to the books of the Western Electric Company to find out whether that statement was true or not. I don't think we understand each other on the term "free access." Free access to me, means that I have the right to look at any book, without making a formal written request, and having it passed upon by counsel.

I don't say that I expected that I could go down to the office of the Western Electric Company in New York, and [fol. 7495] see anything that they had and determine myself whether it related to this controversy or not. I am simply defining my interpretation of "free access."

As an accountant the ordinary and normal course when I am examining records is, that every book, record, paper, correspondence file, whatever it may be, is to be absolutely at my free disposal, if I think it relates to the subject matter I am examining. I am to determine what relates to the subject matter that I am examining. The company, whose records I am examining, doesn't get an unqualified certifi-

cate if they object. I don't know what requests I have made would relate to X-79. This plant appropriation might, and it might not. The plant appropriations of Western does not relate to the earnings of the Electrical Research Products but they might relate to the assets of Electrical Research Products. Heretofore when asked about whether I would certify or not, I said so many elements entered into it that I could not answer the question.

I don't believe it is a fact that I was taken off the witness stand, and came back the next day and said that I could not certify to that statement, because I had been denied information.

If you want to know definitely why I wouldn't certify X-79, it is simply because I did not have free access to all of the books, documents, papers, correspondence, and everything that related to the company. I think that my testimony this morning covers everything that I was denied, or refused access to, that had any relation whatever to the work I did on X-79. I think they are all here.

Item 4, "Basis of profit on deferred payments on installment sales" in the letter of January 12th, related itself to X-79. I seriously advance that. What I was doing in Exhibit X-79 was to show the profit from operations of the Electrical Research Products, Inc., and the percentage of return for the years 1927 to 1930. What I wanted to know in this request was the basis of profit on deferred receivables. The books were open to me, the letter so states. The letter dated February 9, 1932, states that I was given full access to Erpi's books, but when I asked for the books I had to mention specific instances and specific books. I don't call that free access. The journal entries, the cash books and the ledgers were all turned over to me for my [fol. 7496] examination, as requested by me for specific ones. I don't know whether I got them all or not. My complaint is that you said I had free access, and I said I didn't.

Besides item 4, wherein I was denied access to information that underlies Exhibit X-79, there was the correspondence with and filings of the Internal Revenue Department, in so far as they relate to Electrical Research Products. Also there is Item 1 of the same letter, which asks for copy of an option agreement sold by Western Electric Research Products, Inc., in 1927. I am not familiar with what took place in court and do not know that when Mr. Gregory was

on the witness stand on the 24th day of March, that Mr. Goldstein requested a copy of that option agreement, and was advised that it was on the train here, and that it was furnished to him the next day.

I don't know whether everything contained in that Number 1 request was testified to by Mr. Gregory on the witness stand under oath. I don't know what he testified to. At the time I made this request, I don't think anything had been testified to in respect to that.

"Q. I see. What you are doing, then, you are not giving what has finally been denied, or the information that they haven't got, but you are just giving what was denied to you?

A. I can only testify to those facts of which I have personal knowledge.

Q. Didn't you go over this carefully? Is it not the purpose of this to show what had ultimately been refused?

A. The purpose was to show what had been refused me.

Q. All right. And that is as far as you go?

A. Yes."

As to whether the foregoing are all the things that could possibly relate to X-79, Item 8 of this letter of Feb. 3rd might or might not. I don't know, I was not furnished the information. I cannot pass upon it. The denials of information underlying D-61 may or may not be involved. I do not know that they are not involved. Those were the details that had to do with the non-Bell profits of the Western, prior to 1925, and I excluded in my Exhibit X-79 any consideration in anything excepting Erpi's operating profit. [fol. 7497] D-69 couldn't have had anything to do with it, except so far as allocation between Bell and non-Bell is concerned. I do not make any allocation in D-61 between Bell and non-Bell, but D-61 is tied up with the dividend paid by the Western and the Electrical Research in 1927. I made the statement that D-61 might or might not have some bearing on it, I don't know. I never saw the working papers underlying D-61 when I made my study.

In Exhibit X-311, a letter dated February 15th, is as follows:

"Verbal request made about 12:00 midday. Informed at 3:15 to put through written request. Request put through at 3:55. Asked about three times between 4:15 and 5:30.

informed at 5:40 the men had gone home who handled the folder. Received the folder at 10:00 a. m., 2-16-32."

If all that I say there is entirely accurate, I had a delay in the matter from noon of the day until ten the next morning. That is the only delay I have listed in this exhibit X-311.

There are several delays, but they are not all reduced to writing. I am not claiming anything with respect to those delays.

June 20, 1932.

I said previously that the failure to give the plant appropriations of the Western from 1924 to 1930 might have affected the work that I did in connection with X-79. Since I have not seen the plant appropriations, and I do not know whether they cover the Western and subsidiaries, or only the Western, it is pretty hard for me to give a definite answer as to how the failure to get the information would affect X-79. The plant appropriations were asked for as to the Western only, but still, I do not know whether the plant appropriations would cover subsidiaries or not.

"Q. How could it possibly have affected the situation with respect to Exhibit X-79? There you were only including the average investment of the Western in the Electrical Research Products, which did not include any plant investment at all, and you were only ascertaining the earnings of the Western Electric Company on the original dollars invested by it in Electrical Research Products.
[fol. 7498] A. The Electrical Research Products has a certain amount of plant."

I did not ask for the plant appropriations of Electrical Research Products, Inc.

If these plant appropriations of the Western Electric Company only covered the Western Electric Company, it would not affect Exhibit X-79. That is all I asked for.

I testified about a refusal of a request to give us the basis of profits on deferred payments, on installment sales, that is, a description of deferred receivables. That request was made on January 12, 1932, I think. I have not the letter in front of me. To what extent Mr. John E. Otterson had testified in connection with that particular matter in January 1932, I didn't know, because I never made a very

thorough examination of his testimony. I said I had seen an abstract of Mr. Otterson's testimony before I was on the witness stand. I was here saying that not only had there been a refusal to furnish this information, basis of profits on deferred payments, but possibly it might have interfered with my work in the preparation of Exhibit X-79.

(Counsel reads from the deposition of John E. Otterson, on redirect examination by Mr. Goldstein taken January 13, 1932):

"Question: Mr. Otterson, you stated at the previous hearing that there were four classes of transactions: So that we may have it correct, I will ask you if you stated that one is the outright sale of equipment; the second is sales of equipment on the installment plan; the third, the licensing or renting of equipment where title to the equipment is retained by the Electrical Research Products, and fourth, royalties received for the use of processes. Are those four classes of transactions correctly stated?

Answer: I think so.

Question: Are there any other classes of transactions by the Electrical Research Products other than those four mentioned or does that include the entire system of activity of the Electrical Research Products Company?

Answer: May I have that other question read?

Answer: I think those cover all the activities. I do not think, however, that is a complete statement.

Question: But in a general way, that covers it?

[fol. 7499] Answer: Yes.

Question: With reference to the sales of equipment on the installment plan——"

(Testimony of witness):

That is the thing we are talking about.

(Deposition continues):

"—the purchase price of the equipment, as I understand it, is entered as in the year in which the sale is made, is that correct?

Answer. Yes.

Question. Is the entire amount of the purchase price of the sale of equipment which is sold on the installment plan, considered as income in the year in which it is sold?

Answer. Yes.

Question. In other words, if a piece of equipment for $100,000 is sold, payable over a period of years, you enter the $100,000 for accounting purposes as income in the first year?

Answer. That is right.

Question. And the entire expense including the cost of the equipment is deducted in the first year against that income?

Answer. Yes.

Question. Now, with reference to the third class of equipment, that is the equipment where the title is retained by Electrical Research Products, and a license given for the use of that equipment over a period of years, are the license payments—the entire amount of license payments called for by the contract, entered as income in the first year?

Answer. Yes, except where the payments relate to service and not to apparatus. That is where the services are to be performed later.

Question. To get that picture clearer, will you give a concrete instance of one transaction of that sort, a typical case?

Answer. Well, if we sold equipment to a theater, that will be sold generally on a ten-year lease. The payments on account of the apparatus itself would be spread over a three-year period. The payments on account of the service is spread over the ten-year period. The entire payments which are due over the three-year period on account of the [fol. 7500] apparatus, are taken up on the books as income in the year of sale or installation and the expenses in connection with the cost of that apparatus are also taken up on the books at the same time, and the profit that will be indicated during that year as related to that transaction, will be the difference between those two. The amount of payment which has not been made at the time, are carried as receivables. The service charges are taken up as they are received during the year in which the service is rendered."

(Witness continues):

From what has been read, it is apparent that the basis of profits on deferred payments are clearly and perfectly stated in this record by the sworn testimony of the presi-

dent of the Electrical Research Products, Inc., on the 13th day of January, 1932. I knew that that testimony had been given. I did not know when it had been given. I knew it had been given. I did not know exactly what the testimony covered.

In answer to the question as to whether my work was interfered with I say that I did not get an answer to my letter, and I assumed from the failure of an answer to my letter that they were not furnishing me with that information. I had no knowledge of what any of their officers had testified to. I was in New York and the lawyers in the case were here in Chicago. I didn't even know that the deposition was taken in New York. These requests for information were not all approved by counsel. I think they knew I was making this request for the information about the deferred payments, but I would not be sure. I think they knew I was making it.

My letter in connection with the basis of profits on deferred payments was January 12, 1932. In the accounting of the Western Electric Company I believe that deferred receivables and deferred accounts receivables are two different classifications. On January 19th, as shown on the third page of this letter, Mr. Gregory sent me a statement showing, by years, an analysis of deferred receivables on monthly report No. 1. In his letter he said:

"In addition to the item known as the deferred receivables, there are deferred accounts receivable covering deferred payments on sound picture installations, not due. [fol. 7501] Those are included in monthly report No. 1, accounts receivable, as follows:

And then he sets them out. They run from six to eight million dollars for 1928, 1929 and 1930. After that I did not request further information from Mr. Gregory in connection with this subject matter.

"Q. In other words, the situation about which you complain is this: He sent you a list of what were the deferred receivables, the exact thing that you had inquired about, and then he told you that there were deferred accounts receivables, and gave the amount of them, and you made no further inquiry about it?

A. I think I made a verbal inquiry, but I do not recall just now what I did say.

Q. It is further a fact that you know there was a misunderstanding about this, and that on January 9th—no, on February 11th, Mr. Gregory wrote you on a letter that is contained in your Exhibit X-311, referring to another item that you were inquiring about as shown by your letter of February 9, 1932, an analysis by years of accounts receivable and so forth, that 'With respect to that item, we understand that you are changing these requests. You may therefore consider the answers given, namely, on February 9th, as withdrawn, pending the receipts of further information from you.'

Did you ever give him any further information about it?

A. I do not think the two things are exactly related.

Q. No, I know they are not, Mr. McCann, but there were three things here: There were deferred receivables, deferred accounts receivable and these future payments due on account of services, and I am asking you if it is not a fact that there was a clear misunderstanding between you and Mr. Gregory about it, and that after that misunderstanding developed, you made no further request for any information?

A. I do not think that is a statement of facts, because there is a letter of February 26th, in which——

Q. All right. Is it here?

A. It is. Our letter of February 26th, to the Western Electric Company, and Mr. Gregory's letter of February 26th, addressed to us.

Q. Is this letter of February 26th a repetition, in your [fol. 7502] opinion, of the request No. 4 in the letter of January 12th?

A. No, it is not."

I have stated that I made a request under date of February 8, 1932, which reads as follows:

"Executive Committee authorizations for allotments, stock purchases, loans and so forth, for the years 1920 to 1930, inclusive."

Referring to the language, "and so forth"; it was my position that I should be allowed to examine, pursuant to this request, all of the executive committee authorizations of the American Telephone & Telegraph Company. Apparently the substance of this request was that the entire minute book of the executive committee of the American

Telephone & Telegraph Company should be turned over to me for my uncontrolled inspection. By "uncontrolled," is meant not that I should take it away, of course, but that I should have the perfect right to examine anything contained in the minutes of the executive committee. That was denied. I am not familiar with the situation as to whether the minute book for that period of time was here in Chicago, when I testified on Saturday and that the court was to determine which of the minutes of the executive committee were properly admissible in evidence here. I knew there was some discussion about the minute books.

In regard to my statement that there was a refusal to furnish copy of an option agreement sold by the Electrical Research Products, Inc. in 1927, that request was made under date of March 8th. I do not know that I understood that I was advised orally by Mr. Gregory, that he was soon to be on the witness stand, and that counsel for plaintiff had advised Mr. Goldstein that these requests would be answered from the witness stand by Mr. Gregory.

Mr. Gregory talked to me about this request and my impression was that the whole thing was to be referred to counsel. He may have mentioned the witness stand and he may not. I am not certain of that. I understand that Mr. Gregory went on the witness stand and did on March 25, 1932 produce this document that I have indicated a refusal to produce here. I knew that before I went on the witness stand. I knew also that he had testified in open court in the latter part of March. I did not know the exact nature of his [fol. 7503] testimony. I was told by counsel that he had testified about the option agreement.

(An instrument which has been identified as D-61 was marked Exhibit A-227.)

This exhibit is an analysis of profits on business other than the Bell Company from 1881 to 1927, inclusive. I have seen that instrument before. I did not know when it was furnished. I assumed it was not an exhibit that the plaintiff had introduced or offered in evidence in this cause, because it was not so identified. After that paper (Exhibit A-227) had been furnished to Mr. Goldstein, there was prepared by the Western Electric Company and delivered to me at my request an instrument which was originally marked Exhibit X-102, and which is now identified as Exhibit A-228.

(Document marked Exhibit A-228).

That instrument shows an analysis of the profits of business other than the Bell Telephone companies from 1881 to 1927, inclusive, by years, and groups of years. I do not believe it is a fact that after that had been furnished to me, I requested the right to inspect the underlying data that had been used by Mr. Gregory in the preparation of A-228. I asked for the underlying work papers before I was supplied with the exhibit that you just showed me.

(Document of two sheets was marked Exhibit A-229.)

I have not seen the two sheets identified as Exhibit A-229, entitled "Statement showing analysis of profits on business other than with Bell customers," expressed in dollars of thousands. I could not say whether my men saw them because I do not know. If my men copied these two sheets, it must have been done here in Chicago. I had no knowledge, I never saw those sheets. I could not say whether these were copied or not. I am not familiar with it. If they were turned over to employes of Touche, Niven & Company, and were actually copied, that is not in compliance with my request. I don't know whether that was done or not.

"Q. I will ask you whether you were not furnished in New York for your inspection all of the books and records of all of the subsidiaries of the Electrical Research Prod-
[fol. 7504] ucts—I mean of the Western Electric Company, for the years 1916 to 1931?

A. I was only given those particular books that I asked for."

There never was a refusal to furnish me, at my request, the books or records of any of the subsidiaries of the Western Electric Company for the period 1916 to 1931. I do not think I am complaining of anything. I merely made certain statements in connection with these letters. I do not think that I claim that I was not allowed to examine the books. I think I asked for work papers which were denied me. The entire request was the work papers underlying D-61.

Mr. Hagberg was working on this case for Touche, Niven & Company. I do not know whether or not Mr. Hagberg made copies of these papers, Exhibit A-229.

I did not examine the contract between the Electrical

Research Products and the Gary interests in connection with the granting of an option after that contract had been furnished by Mr. Gregory.

I wanted to see all the correspondence with the Commissioner of Internal Revenue or his representatives, and the Western Electric Company, in connection with the income tax returns of the Western Electric Company, and any differences between the company and the Government with respect to income tax. I was not furnished photostatic copies of all the Western Electric Company's income tax returns for the years 1916 to 1930. I do not know that they were furnished to the City of Chicago. Before this correspondence would have been of any use to me, I would have had to have seen their consolidated income tax returns. I saw the consolidated tax return of the A. T. & T. I do not believe that I saw the income tax returns for the Western from 1916 to 1917. I do not recall seeing them. I have prepared exhibits in this case which show the difference between the Western's income taxes as included in Exhibits A-77, A-78, A-79 and A-80 and the amounts allowed by the government for the years 1916-1930. From 1918 to 1930 the figures were taken from the consolidated tax returns. The figures from 1916 to 1917 I got on statements supplied by the Western Electric Company. I had the information [fol. 7505] anyway as to the amount of taxes. I was also furnished with the complete reconciliation statement of income taxes. It appears to consist of twenty-two sheets.

From the use of the consolidated income tax returns of the American Telegraph & Telephone Company and the Western for the years 1918 to 1930, and by the use of the separate returns, or statements in connection with that company, for the Western, for 1916 and 1917, and this reconciliation statement, it was possible for me to tell the difference between the amounts claimed by the Western as in Exhibits A-77, A-78 and A-79 and A-80, and the amounts allowed by the Government for income tax purposes, in so far as those claims had been settled. For the years 1924 to 1930, the fact that there was a reconciliation did not necessarily mean that the thing was settled one way or the other. So far as they had been adjusted between the company and the Government, I had the complete information as far as the figures were concerned.

My Exhibit X-79 was prepared probably the latter part of February. It was one of the last exhibits. That exhibit

was based exclusively on certain information that had been furnished me by the Western, consisting of monthly report No. 1, and an analysis of principal items appearing on the Products Company No. 1 report for the years 1927 and 1931, which had been furnished by the Western to the defendants in this case, and which have been identified in this case as Exhibits D-74 and D-75.

(The document was marked Exhibit A-230.)

I believe that the information contained in Plaintiff's Exhibit A-230 is the sole information used by me in the preparation of Defendants' Exhibit X-79, except so far as it affects the earnings of subsidiary companies, which I obtained from another source.

(Counsel reads from previous cross-examination of witness, as follows:)

"Question: Now, it is a fact, Mr. McCann, isn't it, that you know an examination of these records that the Electrical Research Products was largely financed by means of loans made by the Western Electric Company to Electrical Research Products rather than stock issued by the Electrical Research Products itself or by a bond issue?
[fol. 7506] Answer: I do not know that that is a fact. I never studied that phase of the situation."

I remember my testimony in that connection.

(A document was marked Exhibit A-231.)

Exhibit A-231, which is a statement of loans by the Western Electric Company, Inc., to the Electrical Research Products, Inc., was furnished to me in response to a direct request by me in my letter of January 12, 1932. I did not study the information that was given me. I never used this particular statement. I was requested by counsel to obtain the information. I never used this.

In Exhibit X-79, I gave no effect to the fact that Electrical Research Products was financed by loans made by Western Electric Company. I had before me long prior to the time that I prepared X-79, information furnished by the Western Electric Company concerning that matter. If I had wanted it, I had it.

I had no desire to ascertain, in the preparation of X-79, whether the Electrical Research Products was in fact largely financed through loans made to it by the Western.

(Documents were marked Exhibits A-232 and 233.)

I made some statement about the American Telephone & Telegraph Company having denied me information with respect to the amount of stock and the cost of that stock held by it in the Western Electric Company for 1915 and prior years. I would not be absolutely certain whether or not the information in Exhibit A-232 and Exhibit A-233, the first bearing the legend, D-76, and the second D-77, was furnished by the Western Electric Company to the City of Chicago. It was not furnished to me. I believe I saw this one marked A-233 before, but I am not certain about this one marked A-232.

Mr. Whitworth has been in charge of this investigation for Touche, Niven & Company. He is a member of the firm of Touche, Niven & Co. I report to him.

(Counsel reads from Mr. Whitworth's testimony regarding Exhibit X-79 as follows:)

Question by Judge Wilkerson: "You knew you were to be asked to adopt these percentages as indicating the return of the Electrical Research Products. Now, just what is [fol. 7507] your practice, your general practice, where you are confronted with a situation of that kind, and you were denied access to some essential document or some essential book? Is it your practice to make up the papers from those to which you have access and send them in, or is it your practice to advise the court that you have not the necessary papers upon which to make an estimate?

The Witness: It is generally necessary to advise the court that we have not the necessary facts.

Judge Wilkerson: So you had everything which in your opinion you thought was necessary to the ascertainment of those percentages, or you would have told the court you did not have the documents or the books from which to make that estimate?

The Witness: Yes, sir."

I agree with the answers of Mr. Whitworth.

Redirect examination.

By Mr. Haight:

During my cross-examination, my attention was called to the copy of letter addressed to Touche, Niven & Company by Mr. Heiss, comptroller of the American Telephone &

Telegraph Company, under date of February 8, 1932. I believe I received written instructions from Mr. Goldstein, asking me to obtain that information. I believe they were written instructions. I was in New York when I received the request from Mr. Goldstein. Mr. Goldstein was in Chicago. I had no knowledge of what it was all about. All I did was to carry out the suggestions and made the request.

Referring to a letter of February 15, 1932, the last one in the series produced by me, I was asked on cross-examination if the only complaints I had regarding the delays were those listed in the footnote upon that letter. There were other delays.

(Objection on ground that on cross-examination witness said he was not complaining of other delays. Objection overruled.)

I have made a list of other delays. I listed them upon this document, Defendant's Exhibit X-312, entitled "Statement on Delays."

(Same objection as above.)

[fol. 7508] All of these alleged delays are with reference to something I finally got.

(Defendants' Exhibit X-312, marked for identification.)

The delays that I have listed in this document, Defendants' Exhibit X-312 for identification correctly sets forth the details respecting them. When I say I did not get the data, or the information listed, I mean it was not given to me promptly.

I was asked on cross-examination something about the photostatic copies of the income tax return. I also had showings of the final statements from 1918 to 1923. From the correspondence with the Internal Revenue Department, that we were discussing the other day, I would expect to learn the following:

The first thing that I find out from the correspondence and finding is the basis of the final statement that would give me a clue as to the manner in which the items had been treated by the corporation and the manner in which they had been finally disposed of by the Internal Revenue Department. This information would have been useful in determining whether the tax returns for the years 1924 to 1930 gave effect to these final adjustments made by the Internal

Revenue Department, or whether the tax returns had been left as they were originally prepared. The final settlement was up to and including 1923. With regard to making a certificate respecting any of the things that I investigated, we have not, in respect to any of them, made what I, as an accountant, would call an audit. We do not give certificates short of audits.

(Counsel reads from the deposition of John E. Otterson on cross-examination as follows:)

"Question. Have the books and records of the Electrical Research Products been audited?

Answer. Yes.

Question. By whom?

Answer. Arthur Young & Company.

Question. Are there copies of that audit in the possession of the Electrical Research Products?

Answer. Yes.

[fol. 7509] Question. And have those audits been made for each year, 1927, 1928, 1929, 1930 and 1931?

Answer. For all but 1931. Their auditors are currently and constantly in touch with our accounting department."

And then by Mr. Goldstein:

"Question. Mr. Otterson, to avoid asking you to produce detailed statements covering those various transactions, both as to income and expenses, we would like to have you produce the audits of Arthur Young & Company covering the years 1927 to 1930, inclusive."

By Mr. Thompson:

"We will take that request under advisement. I do not presently see any objection to your having them, but we will let you know definitely a little later."

"Mr. Haight: That was upon the 16th of January, 1932. Anyhow, afterwards, after we had left New York and had gone home, we were advised, as I understand by Mr. Bracelen, counsel for the A. T. & T., that there were no such audits, but there were statements verifying the investment; merely a verification of the Western Electric Company investment, as I understand it.

Mr. Thompson: There was a certificate to the balance sheet. Are you talking about the Products Company?

Mr. Goldstein: Yes, we are talking about Mr. Otterson's

statement under oath that there was a complete audit—there was an audit for that year, for each year, and on the basis of that we asked no further questions about the deferred receivables. He said an audit for each year, and his statement is under oath, and it is the same oath under which he made the other statement.

Mr. Thompson: We will debate that.

Mr. Goldstein: Yes. And would you also read that statement of Mr. Adcock where we called their attention to it in open court, at the deposition. Mr. Adcock made a statement that ought to be in the record.

Mr. Haight: And also on page 791 of the deposition, by Mr. Adcock:

'At the end of Mr. Otterson's redirect examination, we requested the audits of Arthur Young & Company of ERPI which Mr. Otterson testified had been made by Arthur Young & Company and I think the letter of Mr. Bracelen of [fol. 7510] January 19th, states, as a matter of fact, that there were no audits made and that request——

Mr. Bracelen: Did I say that?

Mr. Adcock: There were no reports made, yes, no reports made, and we wanted the audits made at that time, as stated by the record, in order to save time, and for that reason we probably want to recall Mr. Otterson to ask some questions about that situation, not particularly about the audits, but with reference to the subject matter that will be covered by the audits.'

And then there is a considerable wrangle that I will not stop to read. It will be all in the depositions."

Recross-examination.

By Mr. Thompson:

After I had left the witness stand on Saturday, I had a conversation with Mr. Gregory here in the courtroom. I didn't tell him that Touche, Niven & Co. felt that they had wonderful cooperation from the Western in their work. I do not recall what I said. I didn't say that we had fine cooperation.

As to this first alleged delay, I stated "under date of December 29, 1931, we requested the analysis of 1925 cost of sales and supporting details." This information was furnished us under date of January 8, 1932. What I did in this request on December 29, 1931, was to ask for the 1930

and the 1925 analyses of cost of sales. On the same date, that I requested the two, the 1925 and the 1930 cost of sales, the Western Electric Company delivered to me the 1930 costs of sales. They were parts of the same request but were separated by your representative of the Western Electric. The fact is on the day when I asked for the 1925 and the 1930 analyses of cost of sales, the 1930 analysis of cost of sales was delivered to me, and I was advised by the Western Electric Company that their men were engaged in working on the 1925 cost of sales analysis. I believe it is correct that they said that as soon as that work was finished, the other would be delivered to me. They told me they were working on it, or finishing it. As to whether I objected to it or protested against it, why should I protest. I merely asked for it. The first thing that I list here on this, were statements that had been prepared by Mr. Gregory, contained in folders perhaps an inch or an inch and a half thick. I don't know whether the 1930 analysis of cost of sales which [fol. 7511] I had, showed the exact manner and method that Mr. Gregory had followed in both studies.

"Q. Now, Mr. McCann, tell me one place in any exhibit in this case where you have used one thing that was taken from either one of these analyses of cost of sales, 1925 and 1930.

A. Well, I think the cost of sales of 1925 and 1930 enters into every exhibit where these particular years are involved.

Q. All right.

A. Whether I used the figures or not.

Q. Tell me what part of that analysis of cost of sales entered into it, or whether you used that in the preparation of these exhibits.

A. Whether I used it or not, I do not think enters into the question. It enters into the profits, and I did use your profits as a beginning point.

Q. I understand. I am asking you the direct question, whether you used anything—whether you used in any of the work that you did in this case the information contained in these folders, as there contained.

A. I believe I did.

Q. In what exhibit and how?

A. In practically every exhibit as to the Western.

Q. I want your working papers this afternoon, and I want you to point out on those working papers any place where you used any information that was contained in the 1925

and 1930 analyses of cost of sales that was not available to you in the binders that you inspected. I would like to have a written statement on that.

Mr. Haight: All right."

When I made a joint request for two folders containing the analysis of cost of sales for 1925 and 1930 on December 29th, and I come into this court with the statement which showed that I was denied one, I do not see that it is necessary to make a statement about the other having been furnished to us on the date the request was made.

[fol. 7512] W. M. HAMMOND, a witness on behalf of defendants, having been previously duly sworn, resumed the stand and further testified as follows:

Cross-examination.

By Mr. Blackman:

June 20, 1932.

Throughout my exhibits I used the bond rating, such as triple A, double A, single A, BA and BAA, and so on. These ratings and the data that I testified about were taken from Moody's, principally. I do not know what considerations underlie any particular rating which Moody gave to any of the bonds that I use in my tabulation. If I understand your question rightly, I do not know all of the considerations, and I am not conversant with the weight given by Moody to different elements or all of the elements that are considered. As to whether it is necessary to know that in order to make the proper comparison, I say I have not drawn comparisons as to any particular companies. I followed the thoughts somewhat that Mr. Hoyt has expressed in this record, that they are generally recognized in the financial world and by many investors and by banking institutions as indicative of the investment value or quality of bonds. I have compared triple A bonds of the Bell System, as you designate them, with triple A bonds of railroads, and triple A bonds of industries and triple A bonds of other utilities. I have set them up in parallel columns according to the ratings which are found in the manuals and have not attempted to draw any conclusions of my own as to the elements of comparability between the dif-

ferent classes. I would say that there are probably other elements than that of safety that are involved in Moody's ratings. I do not know what those elements are. You would have to examine the history and status of each company in order to make a statement in that regard.

As to my understanding of the requirements necessary for a bond to be rated as triple A by Poor or Moody, I have made no specific study as to the bases on which the ratings are assigned. I know that in the financial market they are rated as the highest-grade bonds. If the assets of [fol. 7513] a company were two or three or four times the amount of the principal of the bonds in question, and of bonds ahead of them, if there were any ahead of them, I would say those were high-grade bonds, but I would not attempt to draw a distinct line between the said statistical factors; there are other factors than those, that can be expressed statistically that may enter into the salability and consequently the rating on the bonds. Moody does rate many bonds as triple A.

I have expressed nothing in my report indicative of a conclusion as to whether triple A bonds are all equally well secured or equally well thought of, or a conclusion of that kind. If you took a bond that is earning its interest charges four or five times over; the company is a prosperous one; well managed, growing; its assets are three or four times the amount of the bonds; and the bond is a first mortgage bond—in that case I would expect to find that bond given a high rating. I would not draw a conclusion based on the data which you have given me as to whether it might be a triple A or a double A. Assuming that it is a triple A, other factors being equal, another bond that was paying its interest rate eight times over, and secured by property that was eight times the amount of the face of the bond, would have somewhat better quality. There is no exact statistical data that can be used, to my knowledge, to define clearly the distinction between triple A and the next grade below. If a bond were earning its interest charges six or seven times over, and the company was a good company, and a growing company, if you ignore all other elements, I could give no opinion then—without considering something more than one element. Ordinarily the asset position, or equity, has a bearing upon the values. If it has one added factor—that is it has assets, of five times the face of the

bonds, the bond is a first-mortgage bond, that is, the assets are four or five times and the interest charges are five or six—I would expect to find that bond rated among the highest grades. It probably would be triple A, but there are other factors which might have a bearing on it. It might fall into the next grade, which comes very close to the triple A, in general quality.

I would say that cases where I have passed upon the [fol. 7514] issue of bonds the records of the company showed that the bond interest was being earned, or would be earned six or seven times over, are not particularly frequent. I don't recall any at this time. The Commerce Commission records may disclose many, but I don't recall any particular case at this moment.

Regarding the security issues that I have passed on, the general average of the bond interest earned would fall between one and three-quarters times, and three times, or thereabouts, some higher and some lower. Those are not merely the upper and lower limits, necessarily.

I wouldn't want to say without further study that a great many bonds do rate as triple-A that are not earning their interest charges more than three times over. A bond earning its interest four times, with other factors strong, probably would fall in the higher grade of ratings, Triple-A, or a grade nearer, Double A. I summarize on my Exhibits X-227, X-228 and X-229, a good many hundred of pages of sheets which I submitted to you, showing the bond averages and prices and yields, and things of that kind.

On these three sheets, I set up in a form in which they could be compared, and make comparison between the yields, as I have termed them, of the Bell System bonds, and bonds of railroads and public utilities. The purpose of putting them there was for comparison and for the purpose of showing the levels as between the different groups.

On Exhibit 229, Bell System bonds, railroad bonds, and public utility bonds are set up in parallel columns.

I would not care to make a general statement as to which bonds show the better yields without adhering pretty closely to the figures.

The way I set up these parallel columns here shows that the yield on the Bell System bonds was better than on the public utility bonds in each of the years 1921-1931 in which I make comparison, except the two years of 1929 and 1930. In the comparison which I make with the railroads, the rail-

roads got better yields in 1923, '24, '25, '29 and '30. In the other years where that comparison is made, I show that the Bell System got better yields as compared with the railroads. The comparison that we have been talking about is the comparison based on the cost to the company, referring to [fol. 7515] the three columns headed "Cost to the Company."

The next comparison I make is made in three parallel columns immediately to the right of those we have been discussing and are under the heading "Yield to the Public." In that comparison, I show that the Bell System bonds were on a lower yield basis, and, therefore, had a better sale than the utility bonds in every year except '21 and '30. If by "better yield" it is meant that the companies were able to sell the bonds at better prices than railroad bonds, so that the charges were less, then that is another question. Then, the answer is, in 1921 the Bell System yield was under the yield of the railroads; in 1922 it was under; it was higher in 1923; it was higher in 1924; it was lower in 1925; it was lower in 1926; in 1927 and '28 there were no Bell issues; in 1929, the Bell was under the railroad yield; in 1930 it was higher than the railroad yield; and in 1931 there were no Bell issues.

In my last comparison, the three figures to the extreme right of the sheet, I compare the spread between cost to the company and average yield to the public. That is taken up principally by the Banker's Commission. In that comparison, it is not correct that the Bell System bonds were less than the Public Utility bonds in every year. In the year 1929, the Bell System is higher than the Public Utilities spread—that is, 33 against 25. In every other year, the Bell System spread is less than the Utilities. With regard to the railroads, the Bell System spread is less in some years, and higher in others.

The same identical figures that appear on Exhibit X-229 also appear on Exhibit X-235; the figures are drawn from the same sources. They appear opposite the line "Average." Taking the year 1929 as an example, in that year the Bell System issued only triple A bonds, and the yield that I have set down for those triple A bonds is 5.33. The yield that I set down for triple A railroad bonds is 4.82, and the yield that I set down for public utility bonds of triple A grade is 4.93. On my summary sheet here, where I make the comparison, I show that for that year, the aver-

age comparison is 5.33 for the Bell System, 5.27 for the railroads, and 5.29 for the Utilities. The figures that I use on X-229, for 1929, in the first column opposite the year [fol. 7516] 1929, and under the heading "Bell System" is 5.33; and in the same line, under "Railroads" is 5.27; and in the same line, under "Utilities" is 5.29.

In Exhibit X-229 for the Bell System for 1929, the yield is 5.33, and in Exhibit X-235, it is the same; for railroads, on Exhibit X-229, 5.27 for 1929; and the same figure on Exhibit X-235; and in X-229, for utilities, for 1929, 5.29, and the same figure on X-235.

I have used the yields, in order to determine the comparison between the railroad bonds and the public utility bonds on the one hand, and the Bell System bonds on the other. I have used only triple A bonds of the Bell System, and I have used as low as BAA grade of railroad bonds. Every grade that was reported is included. In the year 1930, I have used five grades of railroad bonds, and four grades of public utilities, to compare with the one triple A grade of Bell System bonds. They represent the entire financing of each class of business for those years.

I would not follow and I think I have not used the following system:

To compare the goods of Marshall Field with the goods of Carson, Pirie, find that the highest grade stuff in Marshall Field's was rated, at $5, and the highest grade stuff at Carson-Pirie's was rated at $5, and lower grades at Carson-Pirie's at $3, and $2, and even $1, and then add up the Carson-Pirie stuff and find that the average was $2, and say that Marshall Field's prices were two and a half times those of Carson-Pirie.

The difference between that example and what I have done is as follows: This is the weighted average of all of the issues based on the volume of the respective classes, and represents the entire cost for each class of industry for the years that it purports to. It does not necessarily imply that because they are set down side by side, that I mean to infer that each has identical values. They may be compared, I believe, without attributing identical values. My purpose in X-229 was not to draw conclusions as to whether or not the Bell System bonds were getting a better yield or were selling on a better yield basis or had a better market than the railroads or public utilities, but to present the facts that might be helpful in reaching a conclusion. I

[fol. 7517] cannot answer yes or no whether in the summary sheet X-229, I intended the court to understand, and make a finding that the Bell System bonds commanded a better yield, or at least commanded a better price, were sold on a lower yield basis than the utility bonds. The word "intent" there is confusing to me. There was not a purpose or intent, except to present all of the facts, classify these bonds, on the only basis I was aware of, and that is, that which is generally recognized in the investment world as of some value. Beyond that, I have not attempted to express, or attempted to draw a comparison between any particular issues or class of issues.

The triple A bonds of the Bell System are compared with the triple A bonds of the railroads, and the triple A bonds of the utilities in this Exhibit X-235. The exhibits are set up so that if you wish to compare triple A bonds with triple A bonds, you have the figures. I have reached the conclusion that triple A bonds may be compared with triple A bonds. I am not undertaking to say which method shall be adopted. That is for counsel to argue. I cannot say whether, if I had compared the triple A bonds of the Bell System with the triple A bonds of the two other classes, and had used that comparison on X-229, I would have shown just the opposite of what I show here, and would have shown that the Bell System bonds did not command as good a market price in relation to the interest, and that the yield, in order to sell the bond, had to be higher. I would not try to answer that yes or no without reading the figures. I will make up a table and add up the yields of the various years of the triple A Bell bonds, the triple A railroad bonds, and the triple A utility bonds, and tell what the comparison is.

Graphic chart X-227 is X-229 reduced to chart form. That is plainly shown on the face of the exhibit, I believe, or in the testimony. Exhibit X-228 is likewise produced from X-229, based on the figures. The charts are intended to be a faithful reproduction of the figures on the same basis that 229 is built up. The comparison shown graphically on the chart is a comparison of triple A Bell bonds with bonds of other companies, including B's, BA's and BAA's.

[fol. 7518] As I recall, an issue of $219,000,000 of Bell System bonds issued in 1929, I believe, was the only convertible issue of the Bell System included in these exhibits. I don't recall including any convertible bonds of the under-

lying companies of the Bell System. The conversion privilege of the American Telephone & Telegraph issue was a conversion into common stock of the company. I cannot state from memory the exact terms of the conversion.

The convertible privilege has a bearing on the selling cost of the convertible bond. Convertible bonds were excluded from Exhibit X-229, both Bell System and railroads, but they were included in some exhibits set up in parallel columns showing those that are convertible, and those that are not.

I would have to read to you the issues to give you a full answer as to what extent the railroad bonds were convertible. I have a list of them. I haven't the exact figure as to approximately how many were convertible without looking at my papers. I have not reproduced in these exhibits the terms of the convertible features. I examined them, but I did not reproduce them in this exhibit. I don't recall,—there was a long list of them, and I naturally did not attempt to memorize them.

I have produced figures here on the subject of the yields on bonds as compared with the yields on stock, and the yields on one stock as compared to the yield on another stock. I am referring to Exhibit X-250 and subsequent exhibits. In all of those cases I used merely the dividends that the companies were paying. I have so stated on direct examination. In no case did I take into account, or give any weight to the earnings of the company. We would not know from my figures, and my figures would not be changed, if two companies were each paying 8 per cent, whether one of those companies was earning 6 per cent, and paying the additional 2 per cent out of accumulated reserve, or whether it was making 28 per cent and setting aside $20 to surplus, and paying $8 in dividends. I took into account only cash dividends. I am not saying that the companies are comparable.

I have shown a comparison of the yields on the common stocks at the market prices prevailing in each year, based [fol. 7519] on the cash dividends, and for that purpose have grouped together the common stocks of all the utilities that had issued bonds of the different grades; I have also shown the average on the same chart, Exhibit X-250, of all of them combined, and then they are broken down into the Moody's ratings groups.

The only factors that I considered in making the comparisons that I speak of were market prices of the securities and the dividends paid by the companies. I paid no attention to what the companies were earning, and that factor did not enter into my calculations at all. I made my selections of these stocks for comparative purposes by taking the base on which their bonds were selling, where they have been divided into investment groups. The market price of the bonds had nothing to do with the calculation.

A study was made of the common stocks that had an open market, in other words, that were traded in on the public markets; the prices were recorded; the average yield based on dividends being paid were computed. They were grouped where they are grouped in this statement, by taking the companies that had triple A bonds and setting up in a group corresponding, so to speak, the stocks of those same companies, in so far as there was a public market for the stocks. I used the bond basis as the test for determining the comparison of stocks.

Redirect examination.

By Mr. Goldstein:

Referring to Mr. Crunden's testimony in 1929, in connection with which he offered plaintiff's Exhibit 16, appearing in record volume 4, pages 1276-1277, entitled "List of Bonds and Notes of Public Utility Companies Sold in the Open Market during the year 1923. List Includes Only Issues of $5,000,000 and Over," that list contains the identical bonds that I have, only without groupings, and includes bonds whose yields on offering price were in some cases as low as 5½ per cent, and in other cases as high as 7 per cent.

What I did was to take the same bonds and reclassify those bonds according to the classification which Mr. Hoyt gave in connection with his testimony that "in connection [fol. 7520] with the various classes of securities, investors have come to think of bonds in a certain classification, bonds legal for savings bank-, and bonds not legal, they have also come to think of the classifications in the terms of which some of the established services have rated them, that is, A-1 bonds or triple A bonds; many investors have in mind those ratings in connection with the type of securities purchased." I applied Mr. Hoyt's tests, to subdivide all of the bonds that Mr. Crunden used in his exhibit, Plaintiff's Exhibit 16.

My exhibits show the yields according to the classifications as stated by Mr. Hoyt (Abst. 188) as follows: "Many investors have in mind those ratings in connection with the type of securities purchased." My exhibits show the cost to the company on the basis of those classifications, and show all of the information, wherever I have used classifications here, on the basis of the classifications as stated by Mr. Hoyt in his testimony.

Recross-examination.

By Mr. Blackman:

As to where my graphs show the information on the basis just stated, I refer to Exhibit X-236 where you find the yields shown according to each rating classification. X-227 does not attempt to classify the bonds according to ratings. That is the average for the industry. My other summary X-228, as I have already stated, deals only with the totals, and does not deal with the ratings. My other summary, sheet X-229 included only the general average of all of them. I did not understand the question, of Mr. Goldstein to refer to every exhibit as showing a classification on the basis of Mr. Hoyt's classification, but I understood it to be directed to the point as to whether the exhibits submitted by me were grouped according to that principle.

The fact is, the comparison that Mr. Goldstein referred to as having been stated by Mr. Hoyt is nowhere brought out in any of my summary exhibits. It is only on the underlying exhibit where it can be found.

In stating that I had merely followed the table that Mr. Crunden had put in in this case, I refer to the table that appears at pages 1276 and 1277 of the record of the previous trial. In that table there is no comparison of Bell Bonds [fol. 7521] with railroad bonds or any other bonds. They are all thrown together into one group there. That is, they are just a list here of a number of issues of bonds.

I didn't state that I had followed his group to the extent of a classification. I knew well that he did not classify them, and I attempted to carry it one step further. While I was familiar with what Mr. Crunden did in this case, I can't say that it determined the manner in which I proceeded to prepare the data.

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[fol. 7522] GEORGE B. MCCANN, a witness on behalf of defendants, having been previously duly sworn, resumed the stand for further cross-examination by Mr. Thompson, and testified as follows:

Cross-examination.

By Mr. Thompson:

June 21, 1932.

On Exhibit X-312 there are listed nine delays in furnishing information requested. They are all that are introduced.

In the sense that I have used it here, it is a delay if there is a lapse of time between the request and the granting of it.

I think it is quite obvious that our work was interfered with by these delays listed in X-312. If I am asked to do a certain thing and I have to wait ten or twelve days before I can start out, I am naturally that much behind. I do not know to what extent that might have been construed as "substantially" interfering with the work which we were doing with the Western Electric, but I do think they constitute some interference.

Mr. Hagberg, who was associated with me in doing this work, is now on his vacation.

I am familiar in a general way with the work involved in the preparation of Exhibit X-35, which shows the shop variations to basic gross profits, plus and minus, and the other adjustments of the Western Electric Company.

I do not know it to be a fact that all of the underlying data from which that exhibit could have been prepared had been delivered to Touche, Niven by the Western Electric Company, because I personally did not work on it.

"Q. Now, if there is any dispute about that, I want Mr. Hagberg back, and I will put this other question. I will ask you if it is not a fact that at the request of Touche, Niven, and Mr. Goldstein, five men, employes of the Western Electric Company, who were here for the purpose of assisting the plaintiff in the presentation of its case, spent an aggregate of thirty days' time in assisting Mr. Hagberg in the preparation of his Exhibit X-35. Now, if he says he does not know, if there is any dispute about it, I want Mr. Hagberg back.

[fol. 7523] Mr. Goldstein: When Mr. Hagberg started to work on these questions of the shop variations, we got all the assistance that we asked for from the employes of the Western Electric Company, whether there were five men or two men or ten men or fifteen men, I do not know. But he stated from the witness stand that we got all the co-operation.

Mr. Thompson: We took five men, who were out here, to help do the work, and they spent an aggregate of thirty days' time helping you.

Mr. Goldstein: The record will show that those five men were sitting in the courtroom, and I asked Mr. Gregory whether they were all in the courtroom to assist in this case and he said yes, and those are the five men that Mr. Thompson turned over to us, I suppose. And if you want all the facts, it was from July until January 1st, that we kept on requesting until we got it.

Mr. Thompson: All right."

I was engaged in work in New York in the office of the Western Electric Company, in an office furnished for us, continuously between February 12th and February 25, 1932.

At the time I commenced this work, the Western Electric Company was on a five-day week, so that its employes were not working on Saturday. What happened was, that these records that we wanted were brought down to the room that we were given the use of, and there was a custodian, and we were permitted to use the records in that room.

I believe it is correct that between February 12th and February 25th at our request, the Western Electric Company kept its office open on two Saturdays, one holiday and six nights in order to facilitate our work in the examination of these records. When I first went to the Western Electric Company in connection with these records, I knew that others were requesting and obtaining that information for the City of Chicago and the Illinois Commerce Commission, the defendants in this case. I did not know there were four sources altogether. I knew that there was pending in other jurisdictions, either confiscation or rate cases, in which the same question as to the Western Electric prices and their reasonableness was involved.

It is possible that I knew that when requests were being made by four different people of the Western Electric Company, that there was always a chance that there would

[fol. 7524] be a duplication of requests. I do not know what the fact is. I know that there were certain duplications that came to my attention. I do not know it to be a fact that the Western furnished information in this case, and the receipt of it was forgotten, and then weeks afterwards another request was made to furnish the identical information. I do not think it involves anything that I asked for. I cannot answer for the other parties, I do not know. I knew, in addition to that, that the Western had its own rather large business to attend to.

In Exhibit X-312, referring to No. 9, which was the information I said was requested at noon one day and furnished at 10:15 the next morning, I wrote the following:

"The letter of February 12, 1932 requested certain information stated in that letter, and the notations at the bottom of the letter show the routine to get an answer to a simple request."

I do think there was a lot of endless red tape in getting this.

The request of February 15th, analysis of average investment in operation, Bell and non-Bell business, seems to be the same request. A receipt from the Western Electric Company, which counsel for defendants has furnished shows that my request was received not at noon, but at 4:12 p. m. of the 15th day of February, and was supplied to us at 10:12 a. m. on the next morning. Those dates refer to the time that Mr. Coles received the request. He did not receive the request directly from me.

I think that the notations on that particular request outline the procedure that was followed. The request was not in writing at the time we originally made it.

Referring to item 1 as it appears on Exhibit X-312, under date of December 29, 1931, we requested analysis of 1925 cost of sales and supporting details. In a letter that was written by Touche, Niven & Co. signed by Mr. Whitworth, this paragraph appears:

"In regard to the analysis of cost of sales for the years 1925 and 1930, all of which we have already been provided with a photostatic copy by Mr. Benjamin Goldstein, we should like to have the opportunity of examining the breakdown or makeup of this statement when it is convenient for your officials to give it to our men."

[fol. 7525] On the same day that this letter was delivered, Mr. Gregory's men delivered to us the 1930 analysis of cost of sales.

"Q. On the same day Mr. Gregory called Mr. Whitworth personally on the telephone and told him that the work-sheets and underlying data for the constructive analysis of the cost of sales of 1925 were available for your inspection at any time, called him on the telephone and told him that, didn't he?

A. I am not familiar with what conservation he may have held with him.

Q. And also told him that he, Mr. Gregory, wanted to use the underlying data of 1925 for two or three days, and that he assumed that Mr. Whitworth could go ahead with the underlying data for 1930, and that when he finished with the underlying data for 1930, Mr. Gregory would gladly supply him the other.

Now, I am going to show you a letter dated December 30, 1931, from Mr. Gregory to Mr. Whitworth. You read the first paragraph of that letter and tell me if what I said is not true.

A. Yes.

Q. Yes, sir. That is the No. 1, that you are complaining of.

Now, let us see, first we gave you on the date you asked for it the 1930 analysis; secondly, on the same day Mr. Gregory telephoned to Mr. Whitworth, saying that all of this was available at any time, but that he, Mr. Gregory, wanted to use the 1925 analysis for two or three days, that is right, isn't it.

A. That is the statement in the letter.

Q. And the following day he confirmed it by letter. Now, that is not all that happened, is it? You know that on the 30th day of December, the day following this request, at your application, Mr. Gregory sent Mr. Meason, one of the employes of the accounting department of the Western Electric Company, he sent Mr. Meason to your room, where he worked with you a substantial portion of that day, a substantial portion on December 31st, and a substantial portion on January 4th, explaining to you the method by which this analysis of cost of sales had been put up.

A. He worked with me.

Q. Yes, sir.

[fol. 7526] A. I am not certain of the amount of time he spent with me.''

In addition to that, January 1st was a holiday. That came on Friday. Saturday, January 2nd was a non-working day with the Western. Sunday was the 3d of January. I got this folder, this second folder of which we are complaining, on the 8th of January. We had this second folder available for our inspection for twenty-six days after it was delivered to us, and the other folder for twenty-six days, plus the interval elapsing between December 29th, and January 8th.

''Q. Now, I have got these two folders in the court room. What was your purpose in wanting to inspect these folders?

A. Mr. Goldstein was supplied with two photostatic copies of analysis of cost of sales for the year 1925 and the year 1930, and we made an examination of this underlying data to see what data the company had underlying the preparation of these two photostats.''

Our purpose was to find out the method that the company had used, a general scrutiny of the records to see what was there. Particularly we wanted to know the method. We had instructions to that effect.

These had been specially prepared by Mr. Gregory. In other words he had been requested in Michigan to build up a constructive analysis of cost of sales for the year 1930, and he had been requested, in Ohio to build up a constructive analysis of cost of rates for 1925.

I believe it is correct that those were not papers that Mr. Gregory had prepared his exhibits from, that had been introduced in Ohio.

The most of what we were after in this case was to ascertain the method, and to take whatever fact we could get from the papers.

''Q. I want to know whether you took a single fact off those records in those two constructive analyses of cost of sales?

A. I may or may not. Many——

Q. You may or may not. You are complaining of it. I want to know whether you did or did not. Not what the possibility is. What is the fact.

A. I cannot answer that; I do not know.

Q. Isn't it a fact that after all these statements, you still [fol. 7527] want to stand—you still want to maintain before this court that you were inconvenienced in the slightest by any delay that you now claim with respect to item No. 1?

A. If you had furnished the 1925 cost of sales, we would have used it generally with the 1930 cost of sales."

There was no particular reason for not bringing in Mr. Gregory's letter of December 30th, which had that explanation in it. It was not purposely left out.

I do not see that that makes the slightest bit of difference on the question of delays, that Mr. Gregory had telephoned to Mr. Whitworth and told him that the company wanted to use this for a few days and then it would be furnished to him.

If you put it that way, my position is, when I want anything, I want it, and without respect to the convenience of the company that it is used in other matters, my position is that it was to be delivered to us immediately.

"Q. All right. I am glad to get your viewpoint.

Mr. Haight: Of course, our view is, in view of the long delays that we participated in, that immediately was not soon enough.

Mr. Goldstein: Particularly in view of our promise to start on February 15th in this case.

Mr. Thompson: We will discuss that when we meet it.

Q. Now, I want to take it up No. 7 on this list.

The Court: In other words, they should have furnished it sooner than immediately?

Mr. Goldstein: From July to December we could not get anything, and we were after something.

I do not know when Mr. Goldstein got these photostatic copies.

Mr. Thompson: I will ask you if it is not a fact that the photostatic copies which you are talking about that you had were in the possession of Mr. Goldstein from October 6th, 1931 until the date when you made this request, and they were forwarded to you October 6th, and they were forwarded to you; October 6th, November, December, two and one-half months?

A. I do not know when Mr. Goldstein received them."

It may or may not be true that item No. 7, under date of April 8, 1932, a request for adjustments made to net profits

to obtain net income in federal income tax returns, was not [fol. 7528] a request for inspection but one that the Western Electric Company compile the information for us.

(Counsel reads from letter of request dated April 8, 1931 as follows:)

"In connection with our examination relative to the Chicago rate case, will you kindly furnish us with the following information:

"'1. Total federal income taxes paid by the Western Electric Company, Inc., and subsidiaries, applicable to each year of the period 1916 to 1931, and showing also by years how the total tax has been apportioned among the separate companies;

"2. Federal income tax charged to profits, by years, by the subsidiary companies of the Western Electric Company, Inc.' "

That is the request we made. As to whether it calls for any work on their part, I do not know. There are a lot of things that a corporation prepares itself that it could just turn over to me. I understood it did require work. At least, I was told it required work.

"Q. Yes. That request was delivered to the Western Electric Company on Friday, and on Monday morning, April 11th, you were advised definitely that the preparation of the material which you had requested involved considerable work?

A. I was advised that it required work. I do not know how much work."

I do not recall what I was told at the time. As a matter of fact, the thing that we requested involved not only the Western Electric Company, but when it was furnished to us, it also involved the Manufacturers Junction Railway, the Hudson Street Corporation, the Electrical Research Products and its foreign subsidiaries, the Electrical Discount Corporation and the Graybar.

In so far as those corporations had been in existence, the information was furnished us for the entire period 1916 to 1930 or 1931. When we got that, we weren't done then, there were a couple of questions. I believe it is correct that this statement was delivered on the 19th, and on April 22nd, the

Western Electric Company furnished us additional information on this subject matter in response to our oral request. [fol. 7529] An additional statement was furnished to us in answer to further oral questions which had been raised by us. Finally, on April 28th, Mr. John Burgess explained certain data on this subject to our Mr. Loutit, a man who was working under my supervision and direction, and assisting us on this job. Under those circumstances I still claim that there was a delay with respect to that. We have a claimed delay with respect to the Consolidated balance sheet. That request was made by us on January 27, 1931, and the data was furnished to me on February 11th. I do not know if it was furnished to Mr. Goldstein also. I do not recall whether Mr. Goldstein was there when it was furnished.

I assume that by letter of December 19, 1931, Mr. Bracelen wrote to Mr. Goldstein in part as follows:

"I am enclosing you herewith the following exhibits, which we propose to offer in connection with the testimony of Mr. R. H. Gregory, comptroller of the Western Electric Company;

"Consolidated earnings of the Western and its subsidiaries for the years 1916 to 1931, inclusive. This is a new exhibit."

It was the date back of this exhibit about which I am now claiming a delay. The next to the last paragraph in this letter is as follows:

"We are having the figures for 1931 appearing on Exhibits 1, 2 and 5, and all the figures appearing on 3 and 6 carefully audited and checked."

The letter also says:

"I do not believe there will be any major changes, but as soon as this work of auditing and checking is completed, I will advise you definitely as to the result.".

I did not know of that letter when I made this request.

A letter of February 11th from Mr. Bracelen to Mr. Goldstein, the same date that I made my request is as follows:

"Dear Sir: On December 19, 1931, I cent you six exhibits which we propose to offer in evidence in connection with the testimony of R. H. Gregory, comptroller of the Western Electric Company. I advised you at that time that we were

having the figures for 1931, appearing on numbers 1, 2 and 5, and all the figures appearing on No. 3 and 6 carefully audited and checked, and that as soon as the work was completed I would advise you definitely as to the results. This [fol. 7530] work has just been completed, and no changes are indicated as a result of such work, except with respect to No. 3, which is the consolidated earnings statement of the Western Electric Company and its subsidiaries for the years 1916 to 1931, inclusive. I am enclosing a new exhibit for such consolidated earnings, which gives effect to the revision."

I did not know about that letter. The result was, that I made a request of the Western Electric Company on the 27th of January.

It seems to be correct that counsel for the City of Chicago knew if the Western told the truth about this matter, that the underlying data which I was applying for at this time was being examined and checked and audited, and that as soon as that was finished, plaintiff's counsel would advise whether the figures appearing on a statement that had been submitted in December were correct or otherwise. It also appears to be correct that he also knew that if the Western told the truth, the work in doing that had been finished on the 11th day of February, the same day that I got this underlying data.

"Q. If that is true, do you withdraw your claim of delay?

A. I do not see how that affects me. I think that is up to counsel to decide whether to withdraw it or not.

Q. I see. I want to get this definite because I think it is important. If you made a request which you put in your exhibit and claim that delay resulted from it, and that you were impeded in your work, and you found out before your request was made, that a statement affecting the subject matter was delivered to counsel for the City of Chicago pursuant to whose directions you were working, and counsel was advised that auditors were engaged in checking the accuracy of those statements and using the underlying data, and if that was perfectly true, and if the minute that that was finished, these books were turned over to you for your inspection, you would still claim delay.

A. Well I think that is an argument for counsel."

If I knew that the Western Electric Company, because of this litigation, had employed a firm of outside accountants to audit this consolidated balance sheet, and that they were engaged in working on it, and that our counsel had [fol. 7531] been advised of that fact before I made this request, I think my statement stands as it is. I still insist I think it is a matter of argument between counsel. I do not want to become a party to the controversy. My viewpoint about it is that I would have liked to have received the information sooner than I did. I could have made use of it. I still say that, under those circumstances, I claim a delay for which in my opinion the Western is responsible.

Referring to numbers 4 and 6 on my statement, relating to two requests in which we desired the Western to make an analysis for us of principal items appearing on the Products Company No. 1 report for the year 1930, net operations, and in a later request, for the years 1927, 1928 and 1929, I don't know whether they had to get it up or not.

"Q. Well, they told you that they had to get it up, didn't they?

A. I think that is beside the point."

The company has a lot of statements—I am not in a position to know whether they have those statements prepared in the normal course of their business or not. They eventually gave the information to me.

What we asked for was "Analysis of principal items appearing on Products Company No. 1 reports." We had the report, but it meant very little to me. I wanted a breakdown on it.

Before the time I made this request, I had been advised that I could have the right to inspect all the books of the Electrical Research Products.

There were many reasons why I could not have done this job myself. To do the work myself would involve an audit of the Electrical Research Products. I was not making any audit of the Electrical Research Products.

"Q. What you wanted—and it is true time after time, isn't it, Mr. McCann—what you wanted was that the Western should do your work.

A. Not necessarily."

Exhibit A-235 is the information which was furnished

to us in response to requests 4 and 6. I knew, or was advised by the Western Electric Company, before these papers were prepared, that the information was not available in the form in which I requested it, without work, and that it would take a substantial time to prepare this statement.

[fol. 7532] In connection with the request No. 31, the request for the basis for the price paid for Teletype Corporation, was made by me February 3rd. When I made that request I did not know that Mr. Gregory had testified in Ohio, in the Ohio record, as to the basis of the price paid for Teletype Corporation. I knew Mr. Goldstein had the Ohio testimony, but I did not know what it covered, and I did not know when it was furnished. There was a misunderstanding between Mr. Gregory and my firm about the letter of April 3rd, with respect to Item No. 8. There was a conversation between Mr. Gregory and myself in which I said that I would rephrase the questions that were stated in my letter of February 3rd. I do not know that I told him he could disregard the letter. I repeated almost verbatim every request contained in the letter of February 3rd, in the letter of February 8th, and then added three additional requests.

I do not recall when I had the conversation with Mr. Gregory and I cannot say whether he could have easily understood from that conversation that these requests were not to have been answered until he got my additional letter. My impression is I did not receive any response to the letter of the 3rd, and that was the reason for the letter of the 8th.

There was some further misunderstanding about item 8, I think I had tried to explain it to him. There seems to have been a misunderstanding about it.

As to No. 5, pertaining to a request for plant depreciation rates, Exhibit X-312, states "Number of the employes of the Western Electric." My letter of February 11th, making this request, is as follows:

"Data relative to the number of employes of the Western Electric Company, years 1916 to 1930, in so far as available, the number of new employes and releases or retirements in each year and the number in service at the end of each year."

I believe I was told it would take time to prepare this information about the separation of the Western Elec-

tric employes and the number of employes in service at the end of the year.

(Exhibit A-236 was marked for identification.)

Exhibit A-236 is the sheet that was prepared and delivered to me.

[fol. 7533] I believe the Western Electric Co. furnished it to me when they finished it.

R. C. RAINWATER, a witness on behalf of defendants, having been previously duly sworn, resumed the stand for further cross-examination by Mr. Thompson, and testified as follows:

Cross-examination.

By Mr. Thompson:

June 23, 1932.

The only exhibits which have been identified during my direct examination that relate to the Western Electric Company are Exhibits X-293, X-294 and X-295 and Exhibits X-296 and X-297 and X-298 carry some percentages showing the return on investment from the capital stock of the Western Electric Company. They are based particularly on X-294. X-294 is more than a list of the investments of the American Telephone & Telegraph Company in the capital stock of the Western Electric Company from November 17, 1915, to December 15, 1930. It shows figures in X-293 computed on an average yearly investment and the dividends received are related to this yearly average investment.

I do not know whether X-294, the column showing yearly investment, represents the original dollars of investment of the A. T. & T. in Western Electric Company. I know only that I have taken the figures which were furnished to me designated as X-293 and made a computation of the average investment yearly and related that to the dividends. I have no knowledge as to whether these amounts actually represent the original investment. The figures in the column headed "Average Yearly Investment" are the ones shown on X-293. In X-294 I am figuring a return on the dollars originally invested in the Western Electric Company by the American Telephone & Telegraph Company as shown in Exhibit X-293.

If I started in 1916 with $100 invested in the Western Electric Company, and that was represented by one share of common stock; from 1916 until 1930 the company earned money which it did not distribute, and $900 of that money was applicable to my one share of stock, and, in 1930 the [fol. 7534] company earned $100 applicable to my share of stock, my exhibit X-294 would show the rate of return on my share of stock at 100 per cent.

On Exhibit X-294 I have included, in the year 1927, under the column, "Dividends received," a dividend in excess of $45,000,000 paid by the Western Electric Company to its stockholders. These exhibits (X-294 and X-295) attempt to show the earnings of the Western Electric Company in its total business, not in its Bell business alone.

After I have arrived at the yearly dividend to the company on X-294, I then convert that, by the method which I explained to Mr. Blackman in the last column, so as to show a larger return to the stockholders than to the company. So that, for instance, in the year 1927, when the $45,000,000 dividend is included, the return to the company, as I figure, is 101.91 per cent, and to the stockholders 161.16 per cent.

The Western Electric Company of Illinois sold its total assets to a reorganized corporation, the Western Electric Company of New York, at the end of 1915. Before that sale, the Western Electric Company of Illinois had a capitalization of $15,000,000 of common stock of the par value of $100 per share. When the New York corporation was organized, it issued $15,000,000, 6 per cent preferred stock, callable at $120. It also issued 150,000 shares of no par common stock.

Assuming that the book value of a share of stock of the Illinois Corporation was $300, what the shareholder had on the date that this transfer was made, was one share of stock that was worth around $300.

When the preferred stock was redeemed I have treated the $15,000,000 of redemption as a cash dividend.

I do not know the details of the organization of the New York corporation. I was asked by counsel to prepare this Exhibit X-295 on two bases. One, to treat the $21,000,000 as an amount of dollars received, included with the dividends, and the other basis, to treat it as an exchange of stock. That is all I have done with it.

The only facts on which I included "Basis I" were these: I was directed by counsel to show it in this way. I knew that in November, 1915, that there was one share of [fol. 7535] common in the old company exchanged for one share of common and one share of preferred in the new. Some of the preferred stock is referred to in my exhibits as bonus stock. It is not all bonus stock.

When the Illinois corporation sold its assets in November or December, 1915, to the New York corporation, it had $15,000,000 worth of common stock of par value of $100 per share; when the New York corporation was organized, it was organized with a preferred stock issue of $15,000,000, 6 per cent stock, callable at $120, if called before its due date, and 150,000 shares of no par common stock.

If I owned a share in the Illinois corporation, we will say, that had a book value of approximately $300 a share, I got one share of preferred and one share of no par common in the new corporation. Of course, my new common stock was worth less than my old common stock, because it had a preference stock ahead of it. When they redeemed that preferred stock, on one of these bases, I have treated that as a cash dividend. My explanation as to what I was trying to show is that I was asked to show the return on the original capital of Western Electric Company. I am experienced in rate matters.

As to what I expected the court to do with it when I got it up, I really did not give very much thought to the purpose of what it would show. I was merely asked to prepare the computations, and I did it, and that is all. I felt my responsibility in that ended there. If I subjected the Western Electric Company to the same rule that I apply to public utilities, the test would be, what is the reasonable return on the value of its property in a given year.

Referring to page 4 of Exhibit X-295, by following my method (Basis I) on the redemption of this preferred stock, I get a return of 296 per cent in the year 1920. Without converting it for the yield per share outstanding, I get 328 per cent. That is all on account of this redemption. Likewise on page 3, in the year 1920, the per cent of dividends paid becomes 67 per cent on account of this transaction. On page 15 of Exhibit X-295 in the year 1927, the year when the special dividend was paid by the West-

ern Electric Company I get 469.15 per cent, as shown in column 13.

[fol. 7536] Page 10 of Exhibit X-295 refers to common stock issued December 2, 1929, which stock was issued for cash. It was issued on December 2d, and there was a dividend declared of $2 a share, $1 being a quarterly dividend and the other was a special dividend, and because the stock was issued in December, I have figured the annual dividend at 60 per cent, based on a period held, of one month. The same is true of page 11 of this exhibit, except that the figures are different, being based on period held.

I do several things on pages 12, 13, 17 and 18 of Exhibit X-295. First, I classify the issues of stock by years or by periods of time, when it was issued. The classification is shown in the preceding pages, the same items. I find returns on an original issue of 70 per cent; on the common stock of 1920 of 17 per cent; on the common stock issue of 1922 of 47 per cent; on an issue of 1928 of 2/10 of 1 per cent; and then I get down on the next page as low as minus 19 per cent. What I tried to show here is to make a computation as regards the individual issues, to show that the book values of the separate issues, that is, the net assets applied per share to each issue at December 31, 1930, are more or less than the capital at the beginning of the period, and then in connection with that I have taken the dividends received during the period. In other words, I tried to show here as to whether the dividends during this period came from earnings during the period or whether they came from surplus of the prior period. That is what I tried to show here.

In Class 1, "Original issue of stock prior to 1916," page 12 of Exhibit X-295, the average investment that I have there, of $5,995,000, is the original investment in the stock of the old Western Electric Company of Illinois, most of it put in, back in 1881, 1882 and 1883 and the other early years.

The book value of this stock on January 1, 1916, was $40,000,000. The process that I followed is briefly this: These people put their money into this corporation back in 1881 and 1882 and 1883 and 1884, and the other early years, a total of a little less than $6,000,000. By leaving the earnings in the business, when the New York corporation was formed, this stock had a book value of $40,000,000.

From 1916 on down to date, substantial portions of the earnings have been left in the business, so that the book cost [fol. 7537] is now $180,000,000. These earnings that I have got here are for the period 1916 to 1930.

It is not exactly correct to say that I have related earnings made in 1930 on a book investment of $180,000,000, to an original investment made in 1881 and 1882 of $6,000,000. The fact is that the $180,000,000 refers to all of the stock, and this is just the original issue of the stock; that is, the stock issued prior to 1916. Whatever earnings or whatever portion of the earnings is applicable to that stock, I figured it on the basis of its original cost, and not on the basis of any participation whatever in the undistributed earnings as left in the business. And then I take up each issue, and I find that the earnings range from 70 per cent, down to 19 per cent minus.

I have sheets that are identical, so far as the set-up by classes are concerned, but on page 12 I have a return of 70.96 on this original issue, and on page 17 I have 107.65 per cent. The difference is due entirely to the difference in the treatment of the basis 1 and basis 2. In basis 1 I have included the $21,000,000 as a cash dividend, and in basis 2 I have treated it as an exchange of stock, and in basis 2 I have a much larger number of shares of common stock at the end of the period, because of various split-ups. On one theory, I get 70 per cent and another theory 100 per cent, because in one of the exhibits I am treating this redemption of preferred stock as a cash dividend.

On basis 2 I treat the redemption of this preferred stock in reality as an exchange of three shares of preferred for two of common. I know in a general way what happened.

On the 19th day of February, 1920, the Western Electric Company had outstanding $30,000,000 par value preferred stock, 6 per cent, callable at 120, which would mean $36,000,000 for the purpose of calling that stock. Practically all of that preferred stock was owned by the American Telephone & Telegraph Company.

It had a small minority interest in this common stock, so that on that day it offered for sale 200,000 shares of its common stock at $180 a share, under the law it was offered to every stockholder, that is the minority interest had the same right to participate in that as the American Telephone & Telegraph Company.

The A. T. & T. acquired its entire proportionate interest [fol. 7538] in the common stock that was offered to it on the same day. The net result of that was that when it was all through, the Western Electric Company in substance had exchanged its outstanding preferred stock for new common stock. It was a reissue, and a rearrangement of its capital structure. In connection with that transaction, on one basis I treated this as a cash dividend to the amount of $21,000,000 in these exhibits. I was asked to prepare it on both bases.

Redirect examination.

By Mr. Goldstein:

On page 19 of Exhibit X-295, entitled "Earnings available for Common Stock related to Capital Stock and Surplus, based on Averages per Year," I show the earnings of the Western Electric Company related to the capital stock and surplus. That is all the earnings of the Western Electric Company as shown in the annual report. The other sheets on Exhibit X-295 deal only with the portion of the earnings which represents cash taken out from the Western Electric Company related to the cash put in.

Exhibit X-293, which is entitled "Investment in Capital Stock of Western Electric Company, Inc., from November 17, 1915, to December 31, 1930," is a copy of what counsel for defendants furnished me.

Except for what was given me, I have no knowledge of the correctness of the figures shown on the first line, November 17, 1915, number of shares, 146,050 common, price per share $46.08, cost $6,729,710, and so forth, and also on the second line which appears on that sheet.

"Mr. Thompson: That is all. The plaintiff objects to the introduction in evidence of Exhibits X-51 and X-52 for each of the following reasons.

The Court: Well, what is that?

Mr. Thompson: My objection will give your Honor what is shown in this exhibit.

It is admitted by Mr. McCann, who testified with respect to these exhibits, that he has deducted from average investment of the Western Electric Company, notes payable by the Western Electric Company to the trustee of its pension fund to the American Telephone & Telegraph Company and

others, aggregating many millions of dollars. It is like-
[fol. 7539] wise admitted that he has deducted from average investment in these two exhibits, claimed excess cash as testified to by him.

It is also admitted by Mr. McCann that he has not decreased the profits on account of interest paid by the Western Electric Company with respect to its notes payable, so excluded by him in average investment, or with respect to such claimed excess cash items.

Notwithstanding these facts, there appear on these exhibits for each of the years 1916 to 1930, the column headed, "Per cent return on Average Investment as adjusted (before depreciation)."

The exhibits are, therefore, not only of no aid to the court in the solution of any issue involved in this case, but do not represent the facts and are misleading.

To make the same objection to Exhibits X-84 and X-85, except that the excess cash item referred to in the preceding objection does not apply.

The plaintiff also objects to the introduction in evidence of Exhibit X-79; that is the exhibit that relates to the 309.4 per cent earnings of the Electrical Research Products, because it has been demonstrated to proceed on a fundamentally unsound and incorrect theory, and the results shown are contrary to facts.

Mr. Goldstein: Now, counsel evidently misunderstands X-51 and X-52. X-51 and X-52 are merely the exhibits which are a series of exhibits which we have used to lead up to the final conclusion, and these exhibits were prepared in view of the suggestion of his Honor as to what is the effect of a different kind of adjustment. And X-51 shows the adjustment—shows the effect on Mr. Gregory's exhibit, on the rate base adjustments. And then we have the exhibits which show the effect of the profits, and then we tie the two together and we give his Honor the final exhibits which we said should be the exhibits to use. And these exhibits are merely to contain the effect of the particular adjustments, and as stated in X-51, very clearly, they take the net profits per Mr. Gregory's exhibits and adjust the rate base, and show the effect of the adjustments on the rate base related to those profits. We have the other set of exhibits which relate—which take the rate base as Mr. Gregory used it, and show the effect of the profits.

Now, that is what these exhibits are intended for, and we [fol. 7540] so stated at the time.

Now, the same comment will cover X-84 and X-85.

As to X-79, we take issue with counsel that X-79 was prepared on the wrong basis. Just so that counsel will understand something that he has not stated, that the necessary consequences of counsel's conclusion that you must include the loans of the Western Electric Company as part of the rate base, would necessarily involve the conclusion that the Western Electric Company earnings would not show the earnings merely on the basis of loans, but would show the full earnings on the basis of investment.

Now, that is a matter of legal argument. This exhibit was prepared on our theory of the case. It is there. If counsel has any other legal theory, he has his facts. We claim his exhibits are just as unsound on his theory as he claims that ours are on our theory. We both claim they are sound.

Now, your Honor, that is the contention of each of us.

Mr. Thompson: I have one more thing to say about Exhibits 51 and 52. I will not say anything about X-79.

Here is this extraordinary situation, your Honor: It is admitted by Mr. McCann that in these exhibits he has failed to reduce the earnings by about $16,000,000. Now, the result is, we have an exhibit in this case where he takes out from one side the investment, and fails to make a corresponding reduction in the earnings. He does not stop there. If he had stopped there, that would be another thing. And then he comes over here and attempts to put up, on a theory that no one can justify——

Mr. Goldstein: He can. We can.

Mr. Thompson: —a percentage return—a percentage average return as adjusted.

Mr. Goldstein: We can justify it.

The Court: I think I will do this about these exhibits. I will receive them in evidence, but the court will require that as to each of the exhibits to which objections have been made here today, that when the exhibit is printed into the record, the objection of counsel should be printed on the exhibit in some way so that the court will have before it the criticism which is revealed at the exhibit.

Mr. Thompson: That is fine.

The Court: I think they should go in, because from the

standpoint of the plaintiff itself, if half of what is said about [fol. 7541] this is true, and the court should agree with you in the end, it has a very serious bearing upon the weight which is to be given to all of the testimony of the witness who would do such a thing.

Mr. Goldstein: Yes.

The Court: So that I think the exhibits should go in with the objection revealed, the objection leveled at it in conspicuous form, so that the court will have just what this accountant has done and he will have the objection which is made to his work, so that they may have the benefit of the—so that the defendants may have the benefit of it in the end on the argument in the case, that he has proceeded on an entirely fair and rational basis, the defendants will have the benefit of that when it comes to consider his testimony. If it appears that he has brought an exhibit in here on an utterly foolish theory, that has a bearing upon the weight that is to be given to all of his testimony.

Mr. Haight: May not the defendants also have their theory accompany the exhibit as well as the objection?

The Court: I would say I am not making it as to all of the exhibits.

Mr. Haight: No.

The Court: Just as to the one exhibit.

Mr. Haight: I said only as to these specific exhibits.

The Court: Yes, I think that is fair. In connection with the exhibit, there should be printed what counsel has said in objecting to it, and what Mr. Goldstein said in defending it here this morning. I have no doubt that the attorneys who have charge of this work can agree upon the legend which is to be made on the exhibit.

Mr. Bracelen: Your Honor, I take it that the same instructions of the court will apply to all exhibits, as well as particular exhibits.

Mr. Thompson: Where objection is made.

The Court: Where specific objection is made. I have no quarrel with that way of handling it. It would be very convenient for the court to know if there is some particular point which is made against an exhibit, that it omits an essential element or something of that kind, to have it on the exhibit, or in the abstract immediately adjacent to the exhibit in such a way that the court will not have to go all through the record to find it; for instance, a criticism which

[fols. 7542-7625] is made upon a heading here, average adjustment.

Mr. Thompson: I think that is a good suggestion.

The Court: Now, the criticism is made that it is unwarranted by any evidence in the record. Now, those exhibits should be so printed and the abstract should be so prepared that it will be brought to the court in such a way that its attention will be challenged, and they will not treat the objection on any other basis than that which is claimed for it, and when we come to consider the exhibit, we will have the point that is made against it in mind, and the justification for it. You can work that out."

[fol. 7626] R. C. Rainwater, a witness on behalf of defendants, having been previously duly sworn, resumed the stand and testified further as follows:

Direct examination.

By Mr. Goldstein:

June 28, 1932.

Defendants' Exhibit X-328, consists of three pages. Page 1 is entitled "Illinois Bell Telephone Company, Chicago Division—Comparison of revenues and expenses and return on average fixed capital and material and supplies, less accrued depreciation, years 1923 to 1931, inclusive"; page 2 has the same heading, excepting the reference is to "Chicago Division, intrastate"; page 3 has the same heading except that it has reference to the "Chicago Division intrastate exchange." This exhibit was compiled from Plaintiff's Exhibits A-49 and A-53, as to all figures except the following:

The reserve for accrued depreciation, and the reserve for intangible capital were taken from the books of the company. There was excluded from the company's figures of miscellaneous revennes shown in A-49, Account 313, interest revenue, and Account 314, sinking and other reserve fund accretions. There was added to the company's figures of miscellaneous revenues the portion of Account 311, miscellaneous rent revenues, which were excluded from A-49. There was added to the company's figures of expenses shown in A-49 the amount for Account 320, rent expense, shown on the books of the company. The taxes were set

[fol. 7627] up on the basis of accruals shown by the books of the company. All changes in the revenues and expenses were made to agree with the accounting classification used in connection with the income showing of the various licensee companies.

X-328 shows for the Chicago Division, Chicago Division Intrastate and for the Chicago Division Intrastate Exchange, the revenues and expenses and returns on average fixed capital and materials and supplies, less accrued depreciation, on the same basis as that shown in Exhibits X-299 and X-300 for all licensees so as to serve as a basis of comparison between them and the plaintiff.

The separation of the figures of the Chicago Division into those of the Chicago Division Intrastate and Chicago Division Intrastate Exchange were the company's figures as to all items contained in A-49 and A-53. Those taken from the books of the company were apportioned on the basis of similar items shown in A-49. The depreciation reserve was apportioned on the basis of plant, using the average fixed capital shown in A-53.

Defendants' Exhibit X-329, consisting of four sheets, is entitled, "Illinois Bell Telephone Company—Entire Company—Return on average fixed capital and materials and supplies, less average accrued depreciation, in excess of the average return of other licensee companies of American Telephone & Telegraph Company during the years 1923 to 1930, inclusive," on page 1; on page 2, the same thing for the year 1931, and on page 3, the same thing excepting the return is on the basis of comparison with all licensee companies, and page 4 for the year 1931 on the basis of all. It was compiled from the following sources:

Page 1, line 1 comes from X-300;

Line 2 comes from X-300;

Line 3 is a computation;

Line 4 comes from X-302;

Line 5 is self-explanatory.

Line 6 shows that the net income available for return under the existing rates exceeded the average return of the other licensees by the amount in each of the years begining with the year 1923:

Line 7 shows the effect of the reduction in rates due to [fol. 7628] the attacked order; as shown by the plaintiff in Exhibits A-52 and A-63;

Line 8 shows the amount by which the net earnings available for return under the attacked rates on the plaintiff's showing would exceed or would fall short of the average returns of the other licensee companies;

Line 9 gives effect to the amount by which the Illinois Bell license payment exceeded that of the other licensee companies for each of the years beginning with the year 1923, as we computed the same in X-146 from the figures furnished us by Mr. Heiss prior to the trial;

Line 11 gives effect to the amount by which the company's depreciation expense as recorded on its books exceeded the Illinois Commerce Commission order as we computed the same in X-158;

Sub-section (b) of line 11 is an additional adjustment which we made in order to give effect to the difference in the depreciation reserve which would have resulted from the use of the Commission's allowance.

This amount is shown in old Exhibit X-521, which was sent to the company. It should be noted that no adjustment is made in this exhibit for the intrastate separation, as naturally it takes the whole company figures into account.

Page 2 covers the year 1931 and is similar to page 1, excepting only that it does not take into account any adjustment of the year 1931 for the license contract, as we have only worked out for that year the adjustment for the Chicago Division.

Page 3 is similar to page 1, excepting that the comparison is on the basis of all companies instead of other companies. The adjustment of the license contract payments by comparison of all companies, instead of others is shown in old Exhibit X-558, which was sent to the Company.

The adjustment shown as 11 (b) came from old Exhibit X-516, which was sent to the company.

Page 4 is on the basis of comparison of all licenses for the year 1931. No adjustment was made for the license contract discrimination for the year 1931 for the reason already stated.

The adjustments shown in line 11B came from old Exhibit X-517.

[fol. 7629] Wherever I say "old exhibit sent to the company," I mean the sheets which were sent to the company, but have not been furnished as exhibits, but have been used as working papers.

Defendants' Exhibit X-330, consisting of two pages, is entitled, "Illinois Bell Telephone Company, Chicago Division," "Return on Average Fixed Capital and Materials and Supplies, less average accrued depreciation, in excess of the average return of other licensee companies of American Telephone & Telegraph Company, during years 1923 to 1930, inclusive," on page 1, and page 2 the same thing excepting the comparison is for all companies. It is a computation prepared on the same basis as X-329, excepting that it refers to the Chicago Division. The sources for X-330, in addition to those used in X-329, are X-328 and X-147 and old Exhibits X-562, X-521 and X-520, which were work sheets sent to the company.

Defendants' Exhibit X-331, is entitled, "Illinois Bell Telephone Company, Chicago Division Intrastate—Return on average fixed capital and materials and supplies, less average accrued depreciation in excess of the average return of other licensee companies of American Telephone & Telegraph Company during years 1923 to 1930, inclusive," on page 1, and page 2, has the same heading except the words, "All licensee companies," appears instead of "Other licensee companies." It is computed on the same basis as X-330, excepting that it gives effect to the additional factor of adjustment due to the change in the method of separating the revenues and expenses between the Chicago Division Intrastate, Chicago Division Interstate, and Chicago Division Intrastate Exchange, as made by the defendants in Exhibits X-264 to X-270-B, rather than as made by the plaintiff.

Item 13-A, additional return of Chicago Division Intrastate, due to adjustment of depreciation expense was computed on the basis of the company's apportionment in A-49 of the depreciation and maintenance expenses.

Item 13-B was taken from old Exhibits X-523 and X-522.

Defendants' Exhibit X332 is entitled, "Illinois Bell Telephone Company, Chicago Division Intrastate Exchange, Return on average fixed capital and materials and supplies, less average accrued depreciation, in excess of the average return of other licensee companies of American Telephone [fol. 7630] & Telegraph Company, during the years 1923 to 1930, inclusive," on page 1, and page 2 is the same except the comparison is with "all companies" instead of "others." It is a computation compiled on the same basis

as X-331, and shows the basis of the comparison for the Chicago Division Intrastate Exchange only.

Defendants' Exhibit X-333 is entitled, "Illinois Bell Telephone Company, Chicago Division—Return on average fixed capital and materials and supplies, less average accrued depreciation, in excess of the average return of other licensee companies of A. T. & T. Company, after adding return due to adjustment of license payments on the basis of Plaintiff's Exhibit A-170, during the years 1923 to 1930, inclusive," on page 1, and on page 2, the same except that the word "all" is substituted for the word "other." It shows the final figures for the Chicago Division, Chicago Division Intrastate and Chicago Division Intrastate Exchange in X-330, X-331 and X-332 for 1923 to 1930, and makes the additional adjustment for the license contract payment to give effect to the showing of the Chicago Division under the license contract which has been computed from the figures shown in Heiss' Exhibit A-170 and underlying exhibits.

Item 2 of the first page is the difference between X-147 and X-151.

Item 2 of the second page is the difference between our computations as shown in the working papers sent to the plaintiff, old No. X-562 and old No. X-568.

Defendants' Exhibit X-334, entitled, "Illinois Bell Telephone Company, Chicago Division, Return on Average Fixed Capital and Materials and Supplies, less Average Accrued Depreciation in excess of the Average Return of other Licensee Companies of American Telephone & Telegraph Company during the year 1931," on page 1, and page 2 is the same except the word "all" is substituted for "others," for the year 1931 makes the same sort of a comparison as shown on X-333 for the previous years, and the adjustment shown as Item 11, Additional Return of Chicago Division due to adjustment of license payment on basis of other licensees, was taken from X-151 and the working papers sent to the company designated as old X-571.

Defendants' Exhibit X-335 is entitled, "Illinois Bell Tele- [fol. 7631] phone Company, Entire Company, Average Cost of Funds used in Business, eight years, 1923 to 1930." It is a computation showing, for the Illinois Bell, the average cost of funds used in business, and is prepared in similar manner to A-164. The figures were taken from the books of the company, the details of which appear in the old

exhibit numbers X-252 to X-259, which Mr. Blackman identified as A-219 and which I understand are to be offered by him.

Excepting in those exhibits where the comparison is made between the Illinois Bell and the other licensee companies, and excepting for the Exhibits X-273 and X-274, which were prepared to furnish the details as a basis for comparison with the other licensee companies, all of my exhibits which make use of the item of interest on loans paid by the Illinois Bell to the A. T. & T. use the figures of actual interest shown on the books of the company and as appear in Exhibit A-219, being the old Exhibits X-252 to X-259.

Defendants' Exhibit X-336, entitled "Ill. Bell Tel. Co.—Statement of Chicago Division, Chicago Division Intrastate and Chicago Division Intrastate Exchange, showing net income required to cover all interest, amortization of bond discount and expense, and an 8 per cent dividend together with resultant rates of return on the plaintiff's showing of average reproduction cost and average book cost, including materials and supplies and cash working capital during the years 1923 to 1930, inclusive," is a computation showing, for each year from 1923 to 1930, net income required to cover all interest, amortization of bond discount and expense and an 8 per cent dividend, together with resultant rates of return on plaintiff's showing of average reproduction cost and average book cost, including materials and supplies and cash working capital.

Line 1 was taken from Exhibit A-219 and is self-explanatory.

Line 2 shows the per cent of return on the plaintiff's showing of rate base on book cost, line 18, and on reproduction cost, line 11 of Exhibit A-53, which would be required to produce the amount of income shown in item 1.

Exhibit X-337, entitled "Ill. Bell Tel. Co.—Chicago Division—Statement showing the net earnings per share available for the stockholders of the Ill. Bell Tel. Co. and the [fol. 7632] average earnings available for A. T. & T. Co. stockholders on their proportionate investment in capital stock of A. T. & T. Co. which would result from varying rates of return on the plaintiff's showing of average book cost including materials and supplies and cash working capital, during years 1923-1930, incl.; same for average reproduction cost," applies varying rates of return to the

plaintiff's showing of rate base in A-53 on the basis of book cost, line 18, and on the basis of reproduction cost, line 11, and shows how much the net earnings available for return resulting from such percentages would be per share of capital stock of the Illinois Bell.

In the second column, for each year it shows the average net earnings per share on the A. T. & T. stock resulting from the net earnings per share on the Illinois Bell stock, on the basis of the A. T. & T. Company paying par for the stock of the Illinois Bell, and on the basis of the A. T. & T. procuring the funds for such purchase of stock from the sources and in the proportions shown by Mr. Heiss in A-164 and in my Exhibit X-108.

I used the A. T. & T. purchase of the Illinois Bell's stock purchased at par, because the Illinois Bell's history shows that the total premiums received by the Illinois Bell for the purchase of stock throughout its entire history was only $4,000.

Exhibit X-338 is entitled "Ill. Bell Tel. Co.—Chicago Division—Plaintiff's Exhibit A-53, adjusted for rate base of book cost of plant, less depreciation, etc., years 1923 to 1930," on page 1, and on page 2 for the year 1931, adjusts the plaintiff's showing in A-53 on the basis of book cost on line 18 by the following adjustments:

1. The average going value was computed on the basis of the percentage relationship of the going value set forth in the Illinois Commerce Commission's order of August 16, 1923, to the book cost at December 31, 1922, and similar percentages applied to book cost for each of the years 1923 to 1930.

2. Depreciation reserve is deducted. Depreciation reserve is computed to give effect to the Illinois Commerce Commission's allowance for depreciation.

3. Construction work in progress was deducted from the plaintiff's showing.

[fol. 7633] Exhibit X-339, entitled "Ill. Bell. Tel. Co.—Chicago Division—Plaintiff's Exhibit A-53, adjusted for rate base of reproduction cost of plant, less depreciation, 1923 to 1931," adjusts the plaintiff's showing on reproduction cost, line 11, to give effect to the following:

1. Deduction of construction work in progress.

2. Adjusts going value to the amount stated in X-338.

3. Deducts the entire amount of the depreciation reserve in full, as shown on the books of the company, but raised to represent the same percentage of the reproduction new of the property as shown in A-41 as the per cent of the depreciation reserve was to the book cost of the plant.

4. Computes the depreciation reserve on the basis of giving effect to the Illinois Commerce Commission's allowance for depreciation.

Exhibit X-340, consisting of four pages, entitled "Ill. Bell Tel. Co.—Chicago Division—Plaintiff's Exhibit A-53 adjusted for net income available for return under rates in suit and for rate base during years 1923 to 1931; same for Chicago Division Intrastate and for Chicago Division Intrastate Exchange, 1923-1930, incl.," adjusts the income in Plaintiff's Exhibit A-53 to give effect to the (1) adjustment of the license contract payments as we computed the same on the basis of the information furnished us by Mr. Heiss prior to the trial, as shown in X-147;

(2) The adjustment of depreciation expense due to the application of the Illinois Commerce Commission order, instead of the company's computation of the depreciation expense as shown in X-158; and

(3) To the defendants' separation of the Chicago Division Intrastate and Chicago Division Intrastate Exchange figures as shown in Exhibits X-264 to X-270B, and also give effect to the rate base as adjusted, as shown in X-338 and X-339.

For the year 1931 full effect is given to the adjustments on account of license payments arising from the computations made on the basis of A-170, as shown in X-151.

For the previous years, 1923 to 1930, as already stated, we have only included such adjustment for license contract payment as we computed from the figures furnished us by Mr. Heiss prior to the trial, as shown in X-147; but, as shown in Exhibit X-333, we have an additional adjustment [fol. 7634] resulting from our computation made from Mr. Heiss' figures on license contract which were offered as Exhibit A-170. That is, to clear this up for the years 1923 to 1930, my exhibits only show the adjustments based upon the documents which Mr. Heiss sent me prior to the trial, and in X-333 I have an additional adjustment, resulting from the additional documents which were furnished during the trial, in A-170. These are not reflected in Exhibit X-340, and I am now about to state what they are.

By giving effect to the additional adjustment for license payment, the percentages in line 9 of X-340, page 1, would be raised from the figures shown for each of the years 1923 to 1930, to the following:

The year 1923, 9.37; the year 1924, 8.67; the year 1925, 8.19; the year 1926, 7.98; the year 1927, 7.98; the year 1928, 8.17; the year 1929, 9.33; the year 1930, 8.27.

Similarly, in line 11 in X-340, the figures would be raised from the percentages shown on that line for each of the years 1923 to 1930, to the following:

1923, 6.35; 1924, 6.18; 1925, 6.06; 1926, 6.20; 1927, 6.48; 1928, 6.81; 1929, 7.87; 1930, 6.98.

In X-340, page 2, the figures would be increased as follows:

The year 1923, line 9, 9.27; the year 1923, line 11, 6.28; the year 1924, line 9, 8.49; the year 1924, line 11, 6.05; the year 1925, line 9, 8.03; the year 1925, line 11, 5.94; the year 1926, line 9, 7.75; the year 1926, line 11, 6.03; the year [fol. 7635] 1927, line 9, 7.74; the years 1927, line 11, 6.29; the year 1928, line 9, 8.01; the year 1928, line 11, 6.68; the year 1929, line 9, 9.05; the year 1929, line 11, 7.63; the year 1930, line 9, 7.91; the year 1930, line 11, 6.67.

Page 3 of X-340, the figures would be increased as follows:

For 1923, line 9, 9.45; line 11, 6.40; for 1924, line 9, 8.54; line 11, 6.08; for 1925, line 9, 7.98; line 11, 5.91; for 1926, line 9, 7.60; line 11, 5.91; for 1927, line 9, 7.61; line 11, 6.19; for 1928, line 9, 7.93; line 11, 6.61; for 1929, line 9, 9.20; line 11, 7.75; for 1930, line 9, 8.16; line 11, 6.88.

I have examined the following reports: MR-1, MR-22A, MR-22B, provisional estimate statement A for the year 1931, provisional estimate statement E for the years 1924 to 1930, the annual reports of directors of Illinois Bell to its stockholders, 1929 to 1931, annual reports of the A. T. & T. to its stockholders, 1920 to 1931, Bell Telephone securities manuals for the years 1923 to 1930, CR-51A for the years 1929 and 1931, CR-53, 1923 to 1930, CR-67, CR-67A, CR-76 and CR-97.

I found as follows:

MR-1, line 46, year 1929, shows "Balance net profit to average common stock."

MR-22A, year 1929, shows comparison of average of actual results with provisional estimates; line 26, "Balance net profit to average common stock";

MR-22B shows, sheet 1, the year 1929, line 26, "Balance net profit to average common stock (annual basis)."

Provisional Estimate A, year 1931, line 41, shows "Balance net profits (after preferred dividend) to average common stock";

Provisional Estimate E, years 1924 to 1930, shows "Balance net profits to average common stock";

Annual reports of directors of Illinois Bell Telephone Company to stockholders, year 1929, page 1; year 1930, [fol. 7636] page 1; year 1931, page 1, show net profits of company related to average capital stock outstanding for year.

Each of the annual reports of the A. T. & T. from 1922 to 1931 to its stockholders shows "Per cent of net earnings to average capital stock outstanding";

Each of Bell Telephone Securities manuals, years 1923 to 1930, shows "Ratio of net earnings to average capital stock outstanding";

CR-51A, line 46, the year 1929 and the year 1931, line 48, shows "Ratio of net earnings to average common stock outstanding";

CR-53 of years 1923 to 1930 shows "Per cent of net earnings on common stock of A. T. & T.";

CR-67 shows the same as MR-22A.

CR-67A shows the same as MR-22B.

CR-76 shows "Balance net profits to average common stock" for each of the associated companies separately.

CR-97 shows "Balance net profits to average common stock" for the entire Bell System.

I have examined MR-14, being a monthly report form entitled "Cash Report," being one of the reports of the Illinois Bell.

I found that the form shows the loans made by the A. T. & T. to the licensee companies, the amount of loans repaid by the licensee companies and the net amount of financing by A. T. & T. to the licensee companies during the month covered by the reports. It would be possible through the use of this form and the annual reports to the Interstate Commerce Commission to compute the monthly average loans to each of the licensee companies based on the balance, at the beginning and end of each month, and annual average could be computed on the basis of the monthly averages.

"Mr. Goldstein: MR-14, I might state, was made available to us, but we have never had a copy. We would like to have a copy of one of those forms, so that we may offer it, we would like to have it produced so we can offer it as our exhibit."

(Witness continues.)

Since Mr. Blackman's cross-examination, I have made computations to show what the effect would be in those exhibits, wherein I compared the Illinois Bell with the other [fol. 7637] licensee companies, by using the actual interest and loan figures, as shown from the books of the Illinois Bell and also using the loan and interest figures for all licensees, as shown by Mr. Heiss in X-103 instead of using the quarterly averages of City Exhibit 142. This is for all of the companies taken as a whole.

(Objection by Plaintiff; objection overruled.)

The figures from Exhibit X-133 for the Illinois Bell, using the actual loans and actual interest figures combined with the dividends and stock figures, would be, for the year 1923, for the Illinois Bell, 7.14 per cent instead of 7.15;

The year 1924, it would be 7.14 per cent instead of 7.13; for the year 1925, no change; for the year 1926, no change; for the year 1927, using the actual interest and actual loans, the figure would be 7.51 instead of 7.47; for the year 1928, the figure would be 7.54 instead of 7.56; for the year 1929, the figure would be 7.51 instead of 7.42; for the year 1930, the figure would be 7.67 instead of 7.66, and if you take the average of all the figures for all the years 1923 to 1930, the new figure would be 7.41 as compared with 7.39 based on the old figures.

Now, taking all licensee companies; the year 1923, unchanged;

The year 1924, unchanged; the year 1925, unchanged; the year 1926, 7.11 becomes 7.13; the year 1927, 7.19 becomes 7.20; the year 1928, 7.31 becomes 7.32; the year 1929, unchanged; the year 1930, unchanged.

Taking the years 1923 to 1930, the average, based on the figures as shown in X-133, would be 7.04, and substituting the actual interest and actual loans would be 7.05.

Taking the percentages as shown in Exhibit X-284, on line 11, of the Illinois Bell, and substituting the actual loans and actual interest, the per cent for the year 1923 would be

8.72 instead of 8.73; the year 1924, no change; the year 1925, [fol. 7638] 8.55 becomes 8.56; the year 1926, the figure 8.37 becomes 8.36; the year 1927, the figure 8.62 becomes 8.69; for the year 1928, the figure 8.96 becomes 8.94; the year 1929, the figure 9.32 becomes 9.46; for the year 1930, the figure 8.22 becomes 8.23.

And taking the average of the period, the old figures would be 8.70, and the new would be 8.73, and for all licensee companies, line 11, the per cents would be unchanged for the years 1923, 1924 and 1925.

For the year 1926, 7.76 becomes 7.78; the year 1927, 7.83 becomes 7.84; for the year 1928, it is unchanged; 1929, unchanged; the year 1930 is unchanged.

The average for the period of the old figures would be 7.52 and the new would be 7.53, and for all the licensees, exclusive of the Illinois Bell, line 11, year 1923, the figure 6.77 becomes 6.78; the year 1924, unchanged; 1925, unchanged; the year 1926, 7.71 becomes 7.73; the year 1927, unchanged; the year 1928, 8.07 becomes 8.08; the year 1929, 7.95 becomes 7.94; the year 1930, unchanged.

The average for the period on the basis of the figures as shown in X-284 is 7.43, and the new figure is also 7.43.

I made a computation from X-284 to show in dollars what the difference would be between the actual figures and the quarterly averages, comparing the Illinois Bell with the other licensees, both using the old figures, and then substituting the new figures. I took the total investment shown in line 10 of the Illinois Bell, and I applied to that the per cent shown in line 11 of the return on investment of the other licensee companies. That would be the return on the investment of the A. T. & T. in the Illinois Bell on the basis of the average return of the other licensee companies, and I got a certain amount, and I compared that with the return shown in line 5, showing the difference in dollars of these per cents as shown on line 11 for the Illinois Bell as compared with the per cents shown on line 11 of the other licensees, and I have made that computation on the basis of [fol. 7639] the figures as shown, and then I made the computation on the basis of the new figures.

My computation was made by comparing the Illinois Bell with all the rest of the companies.

In the year 1923, based on the old figures, it would be $1,448,494, and based on the new, $1,439,690, a difference of $8,804;

In the year 1924, the old figure was $1,978,756, while the new figure was $1,978,756, the same, no change;

The year 1925, the old figure, $1,407,105, and the new figure, $1,412,599, a difference of $5,494;

For the year 1926, the old figure would be $672,482, as compared with $649,795, the new figure, a difference of $22,687;

The year 1927, the old figure would be $1,020,767, as compared with the new figure of $1,075,174, a difference of $54,407;

The year 1928, the old figure would be $1,181,910, as compared with $1,149,405, the new figure, a difference of $32,505;

The year 1929, the old figure would be $2,125,024, as compared with the new of $2,279,812, a difference of $154,788;

The year 1930, the old figure would be $2,010,956, as compared with the new figure of $2,017,551, a difference of $6,595.

If you take the totals for the period, the old figure would be $11,845,494, and the new figure would be $12,002,782, a difference of $157,288. That would help the defendants to that extent.

Exhibit X-285, page 8, is headed: "Dividends and Interest on Stock and Loans paid by Illinois Bell Telephone Company to A. T. & T. in excess of the Average Interest and Dividends on Stock and Loans of other Licensee Companies."

Carrying through all of these changes that I have mentioned before, the figures on line 6 would be changed to this extent:

The figure $472,314 becomes $460,719; the year 1924 is unchanged; the year 1925, the figure $353,475 becomes $352,367; the year 1926, the figure $111,747 becomes $94,226; the year 1927, the figure $287,614 becomes $306,452; the year 1928, the figure $321,055 becomes $287,290; in the year 1929, the figure $291,650 becomes $390,938; and in the year 1930, [fol. 7640] the figure $864,576 becomes $873,299; or, taking the total for the period, the figures as shown of $3,039,390 become, under the new figures, $3,102,250, or a difference of $62,860.

Except for Exhibits X-137, X-142 and X-143, all of my license contract discrimination exhibits do not take into account the equalizing factor on return. My exhibits do not take into account any adjustments due to anything that might be revealed in the minutes of the Executive Committee.

(Defendants' Exhibits X-328 to X-340, inclusive, identified by Mr. Rainwater on direct examination, offered in evidence, subject to cross-examination.)

Cross-examination.

By Mr. Blackman:

The first exhibit that I dealt with today is X-328. I prepared it. I was asked to make a comparison of the showing of the Chicago division with the other licensee companies, and I prepared this statement showing what the return would be on the Chicago division. There is no comparison here. I have worked out here what the return is on the average fixed capital and materials and supplies less the accrued depreciation, just as the exhibit shows.

"Q. Well now is it your idea that this exhibit sets up anything showing any result on the basis of the value of the property used?

A. It is on the basis of original cost. It is on the basis of cost as shown on the books of the company."

This is the exhibit where I depreciated the original cost. I have taken here the fixed capital and materials and supplies. We left out the cash working capital. One reason I left out cash working capital was because in my showing here, I wanted to compare with the showing of the other licensee companies, and the showing for all of them would require some study as to what the requirements for cash working capital were, and I made the comparison strictly on the basis of fixed capital and materials and supplies, and in my revenue figures I left out such items as interest on bank balances that might come about through cash working capital. I have shown here what the return is on the fixed capital and materials and supplies. There is no comparison on this sheet. The comparison that I spoke of is on X-330. [fol. 7641] It is not entirely correct to say that what I really mean by this exhibit (X-328) is, that I am not presenting it as showing anything specific with regard to the return that the Illinois Bell is making, either on its value of the property or the cost of its property, but am setting up some figures here which I later use as a basis of comparison, of the same figures with other companies.

I have tried to work out here what the return was on the fixed capital and materials and supplies. The purpose of

it was to offer the basis of the comparison with the other licensee companies. As I understand the purpose of it, it is for the purpose of comparing certain operations of this company with operations of other companies. I did not have any purpose of my own. I was asked to prepare it on the basis of fixed capital and materials and supplies.

Page 1 of Exhibit X-328 includes interstate business. In determining my basis of comparison, I have deducted the reserve from the cost of the property as shown on the books.

At the bottom of the sheet it says: "This showing of return on investment is prepared on the same basis as the statement for all licensee companies, using the figures shown in Plaintiff's Exhibit A-49, except as indicated by notes (a) and (b) above." Plaintiff's Exhibit A-49 did not give me any of the figures on this sheet except the revenue and expense figures. That note should have read A-49 and A-53 instead of just A-49. I did not intend that note to be misleading. I refer there to these exceptions. Take taxes, for instance, I used the accruals instead of the payments. In other words, the company's Exhibit A-49 showed payments and I used accruals, and company's average fixed capital was taken from A-53. All I did was to just prepare the average fixed capital for the year based on the balances at the beginning and at the end of the year and the materials and supplies are taken from A-53. In these exhibits of the company's that I referred to, they did not proceed on any such basis as I have used here.

In the note on X-328, I say, "using the figures." I do not say it was the basis. Where I say, "This showing of return on investment is prepared on the same basis as the statements for all licensee companies, using the figures shown on Plaintiff's Exhibit A-49," the basis is not the same as [fol. 7642] the plaintiff's.

Referring to Exhibit X-329, in the year 1923 and subsequent years, I purport to make an adjustment which I call "Loss in recorded return, Illinois Bell Telephone Company, due to attacked rates." In the year 1923 I show that loss as $389,000, and in 1924 I show it as $1,566,000. The reason for that great difference is that the figure for the year 1923 was taken from Plaintiff's Exhibit A-52 to give effect to the date of the order, that is the effective date of the Illinois Commerce Commission order, October 1, 1923.

The difference was due to the fact that the amount shown for the year 1923 is the loss, giving effect to the date of the

Illinois Commerce Commission's order of October 1, 1923; while the figures in the year 1924 is for an entire year. So that the deduction that I make for the year 1923, is the loss that took place in one quarter. All of the other figures in that column for 1923 are on an annual basis, but I wanted to deduct here what the actual loss was for that period. I am purporting to show on this sheet what the result to this company would be under the Commission's rates, but giving effect to the date in the year 1923 that the order became effective.

As an accountant, I do not commonly make deductions of quarterly deficits from figures for the whole year, in order to get any intelligible result. But I was trying to show here what the actual experience of the year 1923 would be, with this adjustment only for that period in which the order was effective.

Item 11 down below was worked out on the same basis, of just the quarterly adjustment, due to the effective date of the order. What I was purporting to do here was to show the effect of the Commission's order upon the earnings of this company, based on that part of the year in which the order was effective. That is clear, what I have done.

I made it up because I was advised by counsel to show the effect, based on the effective date of the order, and that is what I tried to do. He instructed me to consider the effective date of the order, and I prepared the adjustments on that basis. My contribution is the mathematics only. All of the figures are on an annual basis except Items 7 and 11 [fol. 7643] for the year 1923. The figures in Line 9 are taken from X-147.

In X-147 I do not make comparison of a mixture of dividends and interest of other associate companies, with a mixture of dividends and interest paid by the Illinois Bell Telephone Company to the American Telephone & Telegraph Company, without discrimination between the amount that was interest and the amount that was dividends.

In Exhibit X-147, line 1, I say, "Return under present revenues from Illinois Bell Telephone Company, entire company, in excess of average return from other licensee companies."

The figure that I show there, which I call an excess is not the excess of the dividends and interest paid by the Illinois Bell Telephone Company to the American Telephone & Telegraph Company, as compared with dividends and interest

paid by other associate companies. There are no dividends in the figure at all. The figure is worked out from X-146. The figure is carried in from X-146 into X-147.

The purpose of X-329 to me was to make a comparison between the operating results of the Illinois Bell Telephone Company and those of other licensee companies. I do not know what purpose counsel might have had in it, but that was what I did. That was my purpose.

I cannot use a mass of figures without having some objective. In order to make that comparison and make it fairly, I made an adjustment in the depreciation account of the Illinois Bell Telephone Company. That adjustment amounts to as much as $4,429,000 for 1930. The net adjustment for the purpose of this statement is $3,000,000 for 1930. There is a corresponding amount of $1,500,000 I have to take off. That I have made up in the manner that was testified to by Mr. Tholin, giving effect to his interpretation of what the Commission determined in this case.

I did not make any corresponding adjustment for the other companies. I had no knowledge of any adjustments to be made in the accounts of the other companies. I made this adjustment that I knew about, as far as the Illinois Bell Telephone Company was concerned, and it was made just as shown. As to whether as an accountant I would take the accounts of these companies that are set up on the same gen- [fol. 7644] eral basis, and make an adjustment of over $3,000,000 in the accounts of one of them, without making any corresponding adjustment in those with which I make the comparison, I say that I have no knowledge as to what the proper figures for depreciation are for the other companies. I made the adjustment here on what the Illinois Commerce Commission had done with regard to depreciation of this company.

I did not know that the minute I had made that $3,000,000 adjustment, I absolutely destroyed the basis of comparison.

I took this large amount out for depreciation in one case, and did not even assume that there was some comparable amount to be taken out in the other, because all of this was prepared according to the request of counsel as to this particular adjustment. I was requested to take this adjustment into consideration, and I did so. It is a fact that in all of these exhibits that have been put in today, I have made them up especially, as directed by counsel. I do not know what

they mean. I do not know what the court should make out of them, after the court has read them.

(Counsel for plaintiff objects to this witness' exhibits, numbered X-328 to X-340. Objection overruled.)

Exhibit X-329 is also a comparison based on what I call cost, and not value. It also is based on figures built up through the deduction of the reserve. Those facts apply to each of the four sheets submitted, designated as X-329. Exhibit X-330 is built up on the same general principle as X-329.

The deduction of reserve, the deduction from the Illinois Bell of this amount which I say is an adjustment of depreciation,—all of these specific things that have been touched upon, apply to X-330 as well as X-329. Exhibit X-331 differs from the previous exhibits in that there are additional adjustments in there, due to the interstate separations, which were taken from the defendants' exhibits. I think that is shown here as Item 9. Item 9 is new. Item 10 is also new. There would be a new balance figure inserted there. With that exception, just two additional lines, all the other lines are the same as in Exhibit X-330. X-332 is the same, except [fol. 7645] that it is limited to the intrastate exchange.

Line 2 in Exhibit X-333 is the difference between the adjustment shown in X-147 and the adjustment in X-151, the license payments.

In Exhibit X-147, Item 4, Total Chicago Division, shows $407,960; and on Exhibit X-151 it shows $444,469. The difference between those figures is $36,509, and that is what is carried into this statement.

Exhibit X-334 is the same as X-330, X-331 and X-332, except that it covers the year 1931 solely, and sets up in parallel columns the result for the Chicago division, Chicago division interstate, and Chicago division intrastate.

In Exhibit 335, there is a typographical error. On page 2, in the first column, under amortization charges, the last figure on the page, at the bottom of the page is $94,492,231. That should be $9,449,231. It is not carried into my other computations.

Following the method which I have used in producing Exhibit X-336, the rate of return, applied as shown in Paragraph 2, would be reduced further and further as the value of the property increased, if there were no increase in capital stock or funded debt, or any other outside obligation in

connection with that property. That is, the fundamental principle on which I have proceeded here is that the greater the value of the property in connection with the other figures which I have used, the smaller will be the rate of return.

In Exhibit X-337 I make certain comparisons and I showed that a 4.91 per cent return to the Illinois Bell Telephone Company results in an 8.31 per cent return to the shareholders of that Company. That is due to the fact that the securities issued by the Illinois Bell Telephone Company against its property, were less than the cost of the property.

The 4.91 return to the Illinois Bell Telephone Company would have resulted, or might well have resulted, in less than the 4.91 per cent to the stockholders, if the securities were more than the cost of the property. If you increase the stock, why, you are going to get smaller earnings per share to the stockholders. I do not know any statement here as to what it is entitled to earn. I have not made any statement [fol. 7646] here as to what it is entitled to earn. I merely worked out what it would be if you provide interest and an 8 per cent dividend. That is all I have done. According to this method, if the stock is watered more and more, I would think it would make a poorer showing; it would make a poorer showing per share. That is, it would appear to the court that the company was needing more income, a higher percentage.

On Exhibit X-339 I go a step further with the reserve, and I not only deduct the reserve but I deduct a figure which is raised to the reproduction cost level. I testified near the end of my redirect examination by Mr. Goldstein concerning certain documents, CR and MR reports. I stated MR-1 shows on line 46 "Balance net profit to average common stock," and I made similar references to the form of the various reports as showing the profit to the average common stock, net profit to average common stock. I had no purpose in stating that those reports showed that comparison.

As to my purpose, I was asked to make an examination of these reports, and indicate what the reports showed, and I went through the reports and referred to this particular line on the report where it showed net profits to average common stock.

(Objection by defendants to question as to purpose of witness.)

I presume that that is something that practically every corporation shows. The basis of stating that comparison and the comparison that I made on Exhibits X-108, X-111 and X-115, which we went over here for two days is the same, as I understand it; that is, showing the return on the common stock. It is my understanding as an accountant that in making its annual reports in the customary form that companies use, showing the relationship between its earnings and its common stock, this company was doing something similar to what I did when I increased the rate of return from 34 per cent to 59 per cent to the stockholders of the American Telephone & Telegraph Company on Exhibit X-111, except that in my Exhibit Number 111, I took only a portion of the stock, that portion that would be represented by the telephone instruments, while in the reports of course, [fol. 7647] the entire common stock is considered. I think the showing is similar. As an accountant I think my procedure was similar to that followed by the company. I was only taking it on a part of the stock, and the company takes it on all of the stock. That is the only difference I know of.

I did not refer to any line in my testimony in connection with the annual reports of the American Telephone & Telegraph Company. I stated that each of the annual reports of the American Telephone & Telegraph Company to its stockholders, from 1922 to 1931, shows per cent of net earnings to average capital stock outstanding. On page 19 of the Annual Report for 1930, it shows net earnings per share available for dividend. In that column it shows the figure for the year 1930 as $10.44. That is, it says on that report that the net earnings per share are $10.44. That is a common expression. I cannot say that I could find it in the annual report of practically every company. I also referred to CR reports. I will read into the record the comparison that I referred to.

CR-51-A shows on line 46 for the year 1929, "Balance net profit after preferred dividends to average common stock, 10.21."

The effect on that comparison that I read into the record, if the surplus of the American Telephone & Telegraph Company had been $1,000,000,000 more than it actually was, and the stock premiums $500,000,000 more than they actually were, I think would be that it would not affect the

figure at all. In the way that I figure the amounts shown on Exhibit X-111, the bigger the surplus and the bigger the stock premiums, the more you would find that the stockholder was earning on his investment. That is according to the method I used, the bigger the surplus and the bigger the stock premiums, the greater the return that I would show that the stockholder was earning on that particular item of investment, as I have shown it in X-111 and X-113, which is only a part of the entire investment. The method followed by the company, which I have called attention to, in these CR's and in the annual reports, may be different from the method I follow, but the expression is the same, as I understand it. Of course, they did not go at it in that way, they [fol. 7648] did not apply any formula to get the answer. I realize that.

I understand that for two days we went over the question of whether the formula that I did use was an incorrect formula, and gave an upside-down answer. I remember that I finally stated that it was a fact that the more the stock premiums, and the more the surplus, the higher the return that I would work out on the investment from the same actual income on a particular item of investment, as I have used it here. As to whether there is no similarity whatever between what I have referred to here today in answer to Mr. Goldstein, and what I did in Exhibit Number X-113, the method is different, but I think the expression of return on stock is the same, except in one case I am working it out on the stock that was applied to a small item of investment, of the total; and here it is the entire stock of the company.

It seems to me that the difference in method and the difference in result is due to the fact that I took a part of the stock and not all of the stock. As to whether I would have gotten the same general result, that is, made it appear that the man who paid into the company $180 per share for his stock was getting a bigger return from the same amount of dividends of the company than a man who paid $100, I do not see that the comparison is exactly the same.

I do not think there would be any difference between the man who paid the $100 and the man who paid $180 in the way I have used the figures, because my calculation was worked out on the par value of the stock rather than on the surplus, and premiums, in addition to par value. I remember I performed a little computation for you, I remem-

ber that I increased the surplus of the company by $1,000,000,000 and that I increased the stock premiums by $500,000,000. I remember that as a result of that I got 140.77 per cent instead of the 59 per cent that I showed on Exhibit X-113.

(Witness excused.)

[fol. 7649] W. M. HAMMOND, a witness on behalf of defendants and having been previously duly sworn, resumed the stand for further re-cross examination by Mr. Blackman and testified as follows:

Recross-examination.

By Mr. Blackman:

June 29, 1932.

I prepared Defendants' Exhibit X-343. That was the paper that I prepared at your request when I was on the stand before. On this sheet, I compare triple A bonds of the Bell System with triple A bonds of the railroads and other utilities. The results that I get by this method compare with the results on my summary sheets, Exhibits X-227 and X-228 and X-229 as follows:

Exhibit X-227 and X-228 reflect the same figures as appear in Exhibit X-229, the tabular statement, so that I take it that a comparison of the one will cover the entire subject.

I will compare the triple A issues with the corresponding periods, and the corresponding classes of business in Exhibit X-229, which embraces all of them together, all classes of bonds.

In the year 1923, on Exhibit X-229, the Bell System, costs to company figures was 5.72. On Exhibit X-343, the yield on triple A is shown as 5.33. The same year the railroad issues on Exhibit X-229 show 5.50 and on Exhibit X-343 they show 5.24. The public utilities, the same year, 1923, on Exhibit X-229, show 6.03 and on Exhibit X-343, they appear as 5.77.

For the year 1924, on Exhibit X-229, the Bell System figures are 5.70, and on Exhibit X-343 there are none, there being no Bell issues of triple A bonds in that year.

In 1925, on Exhibit X-229, the Bell System figures are 5.44 and on X-343 they are 5.19. In the same year the railroads are 5.61 on X-229 and 5.17 on X-343, and in the same year,

1925, the public utility issues are shown as 5.62 on Exhibit X-229 and 5.24 on Exhibit X-343.

In 1926, on Exhibit X-229, the Bell System percentage is 5.02 and on Exhibit X-343 it is 5.02. The railroads for 1926 in Exhibit X-229 show 5.26, whereas in Exhibit X-343 [fol. 7650] they are 4.75. The public utilities in 1926, the percentage on Exhibit X-229 is 5.52, while it is 5.08 on Exhibit X-343.

There are no Bell issues in 1927 or 1928 of triple A class.

Exhibit X-229 shows a percentage of 5.33 for the Bell System, in 1929, and in Exhibit X-343 the figure is 5.33, the same. The railroads in 1929 on X-229 show a percentage of 5.27 and on X-343, 4.82. Public utilities in 1929 on Exhibit X-229, 5.29, while on Exhibit X-343 they show 4.93.

In 1930, on Exhibit X-229, the Bell System percentage is 5.21, and in Exhibit X-343 it is the same. In the same year for railroads in Exhibit X-229 the percentage is 4.90, while in Exhibit X-343 it is 4.80. The public utilities in the same year, 1930, are shown as 5.04 in Exhibit X-229 and as 4.88 in Exhibit X-343.

I have summed up these figures at the bottom and give both the arithmetical average and the weighted average in Exhibit X-343. In each case, the yield on the securities of the Bell System is somewhat higher than the yield on either the railroads or the public utilities.

My other table shows the yield to the public based on the offering price. I get the same result there, that is, the yield on Bell securities is higher, showing that the bonds sold at a lower price compared to the yield than either the railroads or the other public utilities. There is a small difference in that direction. The years 1921 and 1922 are used on the combined issues. I left them off of this one (X-343). There was no purpose in making a distinction other than this; I started with the idea of covering the period from 1923 to date, and then decided that I had time to carry it back a little further with reference to the whole, but did not have ample facilities to extend it further in the time available.

Not having gone into the figures, I do not know whether if I made out a table that was comparable to those sheets, I would have shown a greater difference between the Bell securities and the other securities than I show on X-343. I made no classification according to Moody's ratings prior to

1923. In figuring up the table asked for I did not test out what the effect would result from the inclusion of 1921 and 1922. I would not be able to do that without making a complete classification.

[fol. 7651] Re-reredirect examination.

By Mr. Goldstein:

In the two years, 1929 to 1930, in which the Bell System securities cost to the company was higher than that of the public utilities, the percentage of total money received by the Bell System in those years was 100 per cent triple A money. The percentage of triple A money received by the public utilities, 1929, was only 5 per cent of the total, and in 1930, 13.3 per cent of the total. The ratio of triple A money, double A money and A money and BAA money, that constitutes the total funds, will have a very important effect upon the cost of funds to the company.

Re-recross examination.

By Mr. Blackman:

The experience by which I know that, is a study of statistical matters coming under my experience, public utility financing. I took my last answer on redirect to refer to the aggregate financing of a company by bonds. The cost of money is higher on the lower grade bonds.

A company seeking to raise a given amount of money, or rather to do its financing by bonds, regardless of the amount, if it covers its entire requirements by about 25 per cent in bonds, the bonds being in that proportion with the usual relationship of earnings and equity, gives the bonds a very high character and consequently a low cost. A company with a much larger proportion of bonds of a miscellaneous character will usually pay a much higher average rate because of the fact that it is not only a lower grade, but a larger volume, and that is what is reflected in this statement, is a large volume, as well as the low grade.

Within reasonable limits, as the volume increases, the price that the company is able to sell the bonds at, goes down, even though the bonds may be perfectly good; that is, if you go beyond the customary limits, of probably 50 per cent bonds, or approximately that. I would not say it would make a great deal of difference in low ranges of about 25 per cent of bonds to the total, but you do reach a point

which cannot be measured in a certain percentage with respect to all companies.

[fol. 7652] If a company is issuing triple A bonds that represent only 20 per cent of the value of its property and the company issues at the same time or later, lower grade bonds, it may not have a direct relationship in a given case on the selling price of those bonds although the fact that a company has junior bonds outstanding, places it in a less stable position than if it has only stock under its high-grade bonds. There is the danger of foreclosure and default which does not obtain if there are no junior bonds or lower grade bonds. I think it would have some effect to pull down the sale price of the triple A bonds. I see no basis for putting it up.

I could not answer intelligently whether if one company in an industry issued a lot of low-grade bonds that would have any effect upon the selling price at which another company in the same industry might issue triple A bonds. You are comparing different companies now which might occupy absolutely different positions. They are not comparable, that is, unless I knew the elements that would otherwise make them comparable.

I think without question a given company can obtain its money lower, if it is in a position to issue only triple A bonds, than if it has to issue a lot of miscellaneous lower grade bonds. I do not think there is any question about that.

As to whether the price at which it can sell its triple A bonds is affected by the issue of lower grade bonds, I can only say again, I believe that a company issuing only triple A bonds can obtain a better yield on the money that it might be necessary to raise, than if it must issue a lot of lower grade bonds to raise the funds. I think the fact that a company is issuing high-grade bonds and low-grade bonds, we will say triple A bonds and BA bonds, has an effect upon the price at which it can market its triple A bonds. The triple A bonds would probably not enjoy as much favor among investors as if it had only triple A bonds.

Whether the comparison that I am making here, even on the basis of triple A bonds, is a little unfair to the Bell System, because their bonds were all of a high grade, I can answer only by saying that the bonds are all of a high grade.

If the railroads had issued only triple A bonds, and

[fol. 7653] the other industries had issued only triple A bonds, I would expect to find the yields on those bonds lower and the prices higher. If they had only triple A bonds, I think there would have been a tendency in that direction. If the railroads, for instance, had issued only triple A bonds, I would expect to find their total money, obtained by bonds, lower.

June 29, 1932.

STIPULATION RE EXHIBITS

It was stipulated as follows:

That the method used by Mr. Rainwater of converting the per cent return to the A. T. & T. Company, to percentage of return to stockholders of the A. T. & T. Company, upon their investment in the stock of that company, is used in each of the following exhibits: X-111, 112, 113, 114, 115, 118, 127, 134, 272, 273, 274, 276, 278, 282, 280, 294 and 337.

The average loans of the American Telephone & Telegraph Company to the Illinois Bell Company and other licensee companies based on the figures developed by Mr. Rainwater, and which he has already testified about, appear also in one form or another in the following exhibits: X-131, 132, 133, 134, 135, 136, 137, 142, 143, 144, 145, 146, 147, 273, 274, 279, 281, 282, 284, and in 285, except that they do not appear in pages 1, 2, 3, 4, 9, 10, 11, 12, 17, 18, 19, 20, 21 and 22 of that exhibit; also X-296, 297, 298 and 340, except for page 4.

The method of Mr. Rainwater in making comparisons of the combination of interest and dividends which was referred to in the cross-examination occurs in each of the following exhibits: X-132, 133, 134, 135, 137, 142, 143, 273, 274, 281, 282, 284, 285, except for pages 1, 2, 3, 4, 9, 10, 11, 12, 17, 18, 19, 20, 21, 22.

"Mr. Blackman: At certain places in the record the witness testified that the figures had been furnished to him by the company. Later he said that no figures had been furnished to him by the company. Of course, we contend that we never furnished the figures for the purposes for which they have been used, and if they wish to prove what they did say we furnished and the circumstances, of course, it is open to them to do it, but I shall move to strike out

[fol. 7654] from this witness' testimony the various places at which he said that he had taken these figures from the company and that the company had furnished them to him, in view of his statement later that he got nothing from the company.

The motion is to strike out his statements that the company furnished him these figures, on the ground that on cross-examination he testified that the company did furnish him no figures.

I am not accusing the witness at that point of having made a statement that was not true or contradictory. He merely made a general statement that he got it from the company and on cross-examination I said, "Did you personally get any of these figures?" and he said "No." They all came through counsel.

The Court: Strike out the testimony—the statement that he received the exhibits—he received the figures from the company and in place of it substitute that he took the figures from City Exhibit 142-A or whatever the exhibit is that was furnished by the company—was furnished to counsel at counsel's request for the information made up in that way."

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[fol. 7655] HAROLD D. ARNOLD, a witness for defendant:

Direct examination.

By Mr. Haight:

I reside 174 Summit avenue, Summit, New Jersey; I am Director of Research of Bell Telephone Laboratories, Inc.; attended college at Wesleyan University, Middletown, Conn., and later at University of Chicago, specializing in physics and mathematics, and receiving degree of Doctor of Philosophy in 1911; I have been since then employed continuously in substantially present line of work; I was first employed in Engineering Department of Western Electric Co., beginning January 2, 1911, to do research work in vacuum tube devices.

In 1925 Bell Telephone Laboratories, Inc., was established, which continued the same class of work done by the Engineering Department of the Western Electric.

I have had contact with the Department of Development & Research of the A. T. & T. and became familiar with the

personnel of that department in 1911. I don't know when the name "Department of Development and Research" was given. I sometimes discuss problems with the members of the Department of Development & Research of the A. T. & T., primarily as such problems relate to my own work and not as they relate to theirs; so I have no familiarity with that department's own problems.

The Bell Telephone Laboratories, Inc., does engineering and research work in telephone communication. There are possibly four sources from which problems arise in my own work with the Bell Laboratories, and those are directly from [fol. 7656] the A. T. & T., from Western Electric, from work in my own department and from work of other departments in the laboratory. I should add also Electrical Research Products Corporation as a source.

I am not familiar with the organization or function of the Electrical Research Products, Inc. (called for convenience E. R. P. I.), but I know it is concerned with motion picture engineering and consulting work in acoustics.

My department in the Bell Laboratories is known as "Department of Research." The other departments are the Systems and the Apparatus Departments and a group of general departments including Educational, Accounting and Publications. The Systems Department deals with problems of associating apparatus and systems for telephone use. The Apparatus Department designs and develops specific communication apparatus. I am not, however, familiar enough with that department to name many kinds. However, I do know that they design loading coils, relays, ringers, transformers, repeating coils, retard coil, dials, subscribers' equipment, which includes Bell boxes, and other apparatus of that nature; telephone cables, phonograph recording apparatus they design; talking motion picture equipment; I don't know whether that department does research work in respect to talking motion picture equipment because it is difficult to define the term "research work," but as I understand it, research means the study of substantially new things or substantially new ways of looking at old things.

I don't know whether that department has to do with both theatrical and non-theatrical apparatus, but it does have to do with recording apparatus, reproducing apparatus in connection with talking motion picture equipment.

My department does not directly or indirectly have any-

thing to do with the recording apparatus in connection with talking motion picture equipment except answering questions of a general nature from time to time at the request of other departments and in connection with answering such questions we make inquiry, research or investigation. At one time or another I think we have done research work with reference to all that have been mentioned.

[fol. 7657] Work has been done in connection with the research or design by the departments of the Bell Laboratories with public address apparatus, not, however, with regard to the apparatus itself in its commercial form but as to some of the principles that underlie the operation of such apparatus.

I do not understand the term "electric phonographs for theatres" but I do not think that my department has had anything to do with those because we do not make electric phonographs for theatres, nor does the Bell Laboratories have anything directly to do with electric phonographs for broadcasting stations, but my department has answered questions with regard to such devices and in connection with the answering of questions has performed certain experiments.

Bell Laboratories has had something to do with amplifiers for submarine telegraph cables, having studied the principles underlying their design and having designed such amplifiers. It has studied the principles and made some designs of multiplex telegraph on submarine cables. We have made tests on submarine cables and have used testing apparatus of our own design. We have done research work in connection with that subject. We have studied picture transmission apparatus and designed it; also hearing aids, such as pick-up transmitters, amplifiers and receivers.

Under the term "deaf apparatus" and "audiophone," I usually think of a combination of receiver and amplifier and transmitter.

We have studied the principles of electrical stethoscopes and have designed some.

I do not recall that any of the problems in connection with any of the subjects, the apparatus of which I have mentioned, have come to the Bell Laboratories from the Development and Research Department of the A. T. & T. I wish to modify that. Some of these matters did come from the Department of Development & Research of the A. T. & T., such as transmission of pictures, and phonograph re-

cording apparatus. I do not remember in exactly what form that problem came to us. I do not recall that any problems in connection with talking motion picture equipment came directly from the Development & Research De-
[fol. 7658] partment of the A. T. & T. The same as to public address apparatus for theatres—I do not know its origin.

I do not know anything about the origin of electric phonographs for theatres or for broadcasting stations, nor do I remember the origin of amplifiers for submarine telegraph cables nor terminal apparatus for multiplex telegraphy and submarine cables or testing apparatus for cables.

Picture transmission apparatus came from the Department of Development & Research, A. T. & T.

Certain work with regard to hearing aids did come from the Department of Development & Research, A. T. & T., but I cannot recall what those problems were except that some problems relating to the use of hearing aids on subscribers' equipment for deafened telephone subscribers came to us from that department. I do not remember any other department of the A. T. & T. from which any of these came.

The problems coming from the Western Electric Company related to matters of materials and manufacturing procedure and the design of apparatus, including carbon for telephone transmitters, alloys for use in various processes, including magnetic materials and non-ferrous materials, insulating materials used on conductors and many problems relating to apparatus designed.

Some of the work originating with the Western Electric had to do with insulating material for conductors, but I don't know over what distances such conductors are used, but I have every reason to believe that they are used for all sorts of distances, long and short, and the same is true with regard to other work that I am familiar with and have mentioned; as far as I know, every piece of telephone apparatus can be connected with telephone circuits of any length.

I have mentioned all of the things that I can think of at the moment originating with Western Electric.

With reference to repeaters, Bell Laboratories developed and designed them. I don't know in what kind of service they are used. All I know is that they are used for repeating telephone conversations but I am not familiar with the telephone plant, only that they are used in a telephone plant. Repeaters are used in many places, in fact wherever

[fol. 7659] amplification is necessary, but I don't know enough about the operation of the telephone plant to be able to distinguish between long distance use and other uses.

I have not attempted to answer with respect to the work in the other departments of the Bell Laboratories the work originating with Western Electric.

The work in my department sometimes comes from the Apparatus & Systems Department as there are frequently investigations which lie somewhat outside of their own specific line of work and about which they consult my department. These problems are rather small problems and have to do with questions of mathematical and chemical analyses and in some cases relating to the transmission of speech through certain pieces of apparatus as to whether this apparatus would affect the quality adversely.

I remember one problem which originated with the E. R. P. I. on the measurement of the absorbing power of acoustic materials, and one on the recording of speech on film, and one on the recording and reproduction of speech from phonograph records.

There was another problem I remember relating to insulating materials for submarine cables and a related problem of magnetic materials that related to submarine cables.

My department's work is related to a study of the principles underlying the recording of speech on films and a survey of the possibilities and relative desirability of different methods. The earliest work on that problem that I can recall began about ten years ago. However, the work arising from E. R. P. I. came about four years ago, but work of a general nature on that problem began I think about ten years ago. The request then came from the Development & Research Department of A. T. & T. and was work in connection with the study of the nature of speech on telephone wires. That was before the present company was organized. The work at that time was done by the Engineering Department of the Western Electric. I have not in answering questions and speaking of the subject matter heretofore, made any distinction between Bell Laboratories and its predecessor, the Engineering Department of Western Electric.

In connection with the study of the problem of reproduc- [fol. 7660] tion of speech on phonograph records, we investigated the fundamental underlying principles and made

some experiments and designed apparatus for that purpose, which work ran over a period of eight or nine years.

On the question of insulating materials for submarine cables, we studied various properties of such materials. On problems of submarine cables that are not lead covered, we worked on those probably ten or fifteen years.

Bell Laboratories or its predecessor, Engineering Department of Western Electric, has worked on radio. My own department carried out experimental work and studied the principle of radio and the design of equipment. My department has particularly studied vacuum tubes, and upon that I have worked myself. The work began in 1912, having been continuously and still is in progress. That work has resulted in the use of vacuum tubes in the communication industry. Vacuum tubes are used in connection with telephone repeaters, radio transmission and reception. These are the principal uses.

The work that is completed in my department usually leads to the design of equipment for communication purposes and the information developed passes on to one of the other departments, Apparatus or Systems or both, for use in their jobs. In general the work of my department precedes or consists of the early stages of the consideration of new things for the communication industry frequently, pointing to the desirability of new or different apparatus, and the development of such apparatus falls into the Apparatus Department, such apparatus ultimately taking a part in the communication system, and has to be properly associated with other apparatus. The work of association falls into the Systems Department. The work of my department, for the most part materializes through those other departments.

There are about 1,000 men employed in my department. I don't know the number for the other departments. There is associated with the Department of Research under my administration a shop for the manufacture of vacuum tubes, and that shop has mechanical people whose numbers vary from time to time. I have not included that number in my statement. There are about 300 employed in the vacuum [fol. 7661] tube shop now. The maximum number in that shop has been about 1,000. At its start there were very few people—about 100.

The vacuum tubes are manufactured for the Western

Electric except such as are used for experimental purposes in the Bell Laboratories.

There are not any industries dependent for being on vacuum tubes, but such tubes are the basis of the present telephone and radio plants. There are very many purposes for the vacuum tubes, but they are used generally for the purposes of amplification and in the talking motion picture industry. I don't know whether any of these products are given a name to distinguish them from telephone apparatus generally, but we frequently speak of some of these things as by-products, such as those things which have indicated usefulness for some purposes outside of the communication industry, and in that class come certain developments of the phonograph and talking motion pictures. There are undoubtedly others much smaller in number.

I don't know of any publication that would help in listing those things. Members of our company publish scientific articles. It puts out a magazine called "Bell Laboratories Record" once a month. I don't know whether the Department of Development & Research, A. T. & T., has a publication of that same general nature.

I don't know who owns the stock of the Bell Telephone Laboratories. (It is conceded by counsel for the plaintiff that the stock of the Bell Telephone Laboratories is owned half each by Western Electric and A. T. & T.)

The laboratories charges for the work done and such charges are determined by certain processes that are set up in the Accounting Department by which the time of employees is allocated to specific projects as a basis for charges. I don't know exactly how overhead is charged or allocated. The work is charged entirely on a time basis without regard to the character or the results of the work.

Some undertakings we work upon fail. I have no way of determining the relation of failures to successes, except that the successes are enormously in the preponderance, which is due to the fact that we watch very carefully and promptly, [fol. 7662] if any project shows evidence of not succeeding, we stop it. Our aim is that the non-promising things be killed early. I don't think it would be possible for any records to determine the relation of failures to successes.

Very frequently work has already been done upon projects coming to us from the various sources mentioned, as for instance the Department of Development & Research of

the A. T. & T., the Western Electric Co., etc. In almost all cases some progress has been made on the problems that come to my department and that progress has led to the point where experimentation, and by that I mean work with actual apparatus, is indicated as desirable, or necessary.

Such is true of the problems coming from Development & Research, A. T. & T. With regard to work coming from the Western Electric, it has apparatus and facilities for experimentations. The problems coming from them usually require peculiar apparatus or peculiar processes of experimentation that we are equipped to carry out better than they. Now I am speaking of the work in my own department.

The problems from E. R. P. I. come in the form of a statement of requirements for apparatus to meet. Sometimes there have been experiments by E. R. P. I. as to such problems.

The problems that come from Development & Research, A. T. & T., have usually received careful engineering attention, which includes not merely a statement of the functions that are desired to be obtained or the apparatus that is desired to be developed, but also includes a careful study of the ways in which such results might be obtained up to the point where experimentation is called for.

With respect to E. R. P. I., there is not the same degree of engineering consideration given to their problems when they come to us.

There has been some winnowing out by the Development & Research of the A. T. & T. and by Western Electric which decreases the percentages of failure with respect to the problems coming to us from them.

Occasionally people are transferred from Development & Research, A. T. & T. to Bell Laboratories, and vice versa. [fol. 7663] The numbers are not large; sometimes loans, sometimes permanent.

Shortly after the time when we started on motion picture development certain people were transferred from my department to other departments and also to E. R. P. I. As to my department, there was no transfer from Development & Research, A. T. & T., to Bell Laboratories, and I do not know of any such transfers with respect to other departments of the laboratories.

Among the requests coming to Bell Laboratories for work

from the Western Electric I recall none for work for the Graybar Co.

Mr. Moravec has charge of the records which show the sources of requests for work in my department. I do not know in what form they are kept, and some records were kept when the laboratories were in the Engineering Department of the Western Electric.

There was some work in connection with the Western Union Telegraph Co., but I do not recall just how the work originated. I do not know of its doing any work for the Postal Telegraph & Cable Co. My department has done certain work in connection with Northern Electric engineers, but always at the request of Western Electric. We must certainly have done work in my department for International Western Electric but I do not recall it now. I don't know as to the International Standard Electric. We have done some work for the U. S. Government. I don't recall any work done for the Automatic Electric Co.

I don't know whether the Western Electric makes any profit on work done for it. Some of the work done by Bell Laboratories extends over a great period of years, such as work on vacuum tube development. The first tubes became of practical use in 1913, and since that time there has been constant work and progress, so that now the tubes are altogether different and better than those of the earlier years. The same is true in regard to the studies of the characteristics of telephone speech and the requirements for the proper transmission of such speech. Those problems have been in constant progress during twenty years, to my knowledge, and year by year there have been changes in prac- [fol. 7664] tice and some improvement in results and they are still in progress.

Vaccum tubes were first used between New York City and Washington in 1913 and for continental telephonic communication in 1915. The work prior to 1913 on the specific tubes that were used had gone on for about a year, and upon the general subject, to my knowledge, since I came with the company in 1911. There had been work done on tubes prior to my coming with the company.

There have been instances where work was begun in a certain year and did not come into practical use for seven, eight or ten years thereafter. For instance, development of magnetic materials which found their great usefulness in loading coils—the early work on those alloys certainly

preceded the use of the apparatus by more than the period of seven or eight years.

Another example is the study of insulating properties of materials used on wires which were studied over a considerable period of years and during recent years there has been a considerable change in the process we used as a result of that study. That inquiry and investigation extended for seven or eight years before the results were put into practical use.

Frank B. Jewett is president of the Bell Telephone Laboratories and vice president of the A. T. & T. in charge of its Development and Research Department. I have been Director of Research of the laboratories for about six years. While I was in the engineering department of the Western Electric I was called research engineer.

The problem in a repeater is to add energy to a voice current that has faded away as it goes along a telephone line, so that it can go on from that place with greater power, and the difficulty of the problem resided in getting something that would work fast enough to respond to the high frequency currents that constitute speech, and the occasion for solving the problem was to extend the reach of telephone communication. From New York to San Francisco there are probably 15 to 50 repeaters, depending on the type of construction. The type of repeater used in the Bell System is the vacuum tube repeater. The vacuum tube repeater enters into the problem of transmis-
[fol. 7665] sion in the manner that I just broadly described.

Since 1923 the principal improvement in vacuum tube has been to get a repeater that operates with much less power supplied to the filament which results in a very large saving in the power equipment necessary in a telephone exchange. Coupled with that, is another important improvement in the length of the life of the repeater itself, which has been extended to something like 35,000 hours of continuous service. Consequently, repeater bulbs expense is lessened and the service may be given more continuously through them, since with longer life they are not subject to interruption to the same extent.

Another outstanding development since 1923 has been permalloy, which is a magnetic material of extraordinary properties used in loading coils. Another is the crystallization of the telephone hand set.

It is substantially since 1923 that the transmitter and

receivers and assembly of the present telephone hand set has been perfected.

Since 1923 we have obtained better dielectrics for use in condensers and better arrangement of the materials in condensers such as improvements in the enamel insulation on enamel insulated wire; improvements in the finishes for telephone apparatus; improvements of a mechanical nature resulting in longer life, and improvements in contact metals which form an important part of telephone systems and the development of special relays which will operate with the very small currents that we have in the telephone plant; improved carbon transmitter of the telephone set; improvement in the circuits of subscribers' apparatus particularly in connection with the elimination of side tone in telephone receivers; improvements in net works and filter design to correct for the detriment that voice currents suffer in going over the telephone lines; improvement in optical methods of recording speech, which, for example, are used in our apparatus for mechanically speaking numbers called on the dial telephone.

Condensers are used in subscribers' telephone sets and very widely in the electrical art, but the condensers upon which I have worked have related to the communication industry, that is, transmission of intelligence by means of [fol. 7666] electrical currents, including radio, signalling through the telephone system at whatever frequency is carried, television, transmission of pictures. I do not include talking movies. I would include the operation of telegraphy over a system.

All the work that we have done in the phonograph field has come to fruition since 1923; also aids for the hard of hearing, and talking motion pictures; and some of the work connected with public address systems, which is a system or device whereby a voice or program is made audible to a large audience by electrical means, including microphones, amplifiers and loud speakers, has fallen within that period.

My department has never done anything with reference to teletypewriters or telegraph typewriters. I don't know whether other departments of the Bell Laboratories have.

My department in 1923 I think had about 300 or 400 people in it. The occasion for the increase from that time to now has been the growth in the numbers of problems of the various kinds I have mentioned.

The same or substantially the same divisions or departments have existed in the Bell Laboratories since it was organized, making allowance for the changes in personnel and work. The principal difference between the Research in my department of the laboratories and the research of the Development & Research Department, A. T. & T., is that Development & Research A. T. & T. does not make use of experimental apparatus to any considerable extent but conducts its experiments with facilities that exist in the telephone company, whereas in my department, the majority of all the work is carried out with experimental equipment, laboratory apparatus facilities, power supplies, motors, balances and that sort of thing that are special to the work and frequently have to be specially designed and manufactured for the work. My company has more than one building in the sense of occupying space in more than one building. We have some small laboratory buildings in the field which we use for radio experimentation solely. We have no laboratory devoted solely to television. We have a part of a building that we devote solely to talking pictures. It is a building attached to the main building. It is on the Bank Street side of our laboratory group. It [fol. 7667] has about three stories but I don't know the floor area.

There have been only one or two cases when one of my department's men have gone into the field to observe the operation of talking motion picture equipment. I don't know about the sending of men from other departments.

The work in the talking picture building is in connection with the recording and reproducing of speech from films and other records, and new devices are tried out there which is a large part of the work done.

My understanding is that E. R. P. I.'s principal business is talking motion pictures. Probably some half dozen men went from my department at one time or another to E. R. P. I.—one or two were scientists and the others were laboratory engineers or assistants. No men were sent from my department to Western Electric in connection with talking pictures. I don't know as to other departments.

The period prior to 1923 saw the growth of the vacuum tube from an apparatus that was difficult to manufacture with uniform characteristics, into one that could be manufactured with great uniformity. It saw the settlement of

the major features of rough design which allowed us to produce tubes that were fairly satisfactory for our purposes. That period was a period of blocking out the problem of vacuum tube design and of obtaining some of the fundamental information about the production of vacuum tube filaments and some of the information about the operating characteristics of vacuum tubes. The period from 1923 on has been more nearly a period of perfecting these devices and making them cheaper and more satisfactory in service; also, from 1923 on, new principles of vacuum tube manufacture have been found and some entirely new lines of work have been started in connection with the arrangement of the parts inside the tube to make them function better.

Referring to telephone hand sets, they have been used for particular purposes as long as my memory runs in the telephone plant, but these hand sets were not satisfactory for use by the public on ordinary subscribers' premises. I cannot point to any time that work on the modern hand set may be said to have been started. It has been an evolution rather than a specifically started development. There has been work on hand sets all the time [fol. 7668] since my first connection with the Western Electric. Satisfactory hand sets first came into commercial use within the last five years, I should say.

The research work done is budgeted during the last two or three months of each year. The budget is subject to revision at any time. On making up the budget I assemble figures for the coming year in view of the personnel and the problems that either have been authorized or appear to be in the process of arising. I believe other departments function similarly. Each project has a cost estimate associated with it which may be on a unit budgetary basis or in some instances may be an estimate extending over several years.

From a budgetary point of view the records are kept as to a prediction of expense on projects and as to the actual expense incurred and these records are reviewed frequently in the course of the project. There is no set custom as to the making of reports on each project at particular times.

The number of people in my department has been diminishing, which includes expense also.

In carrier current systems the signal which is transmitted

is carried by a high frequency alternating current and by high frequency I mean a frequency high with respect to the signal. If the signal to be transmitted is itself a low frequency current, then the carrier current may not be very high. In general one thinks of an example of carrier current operation as one in which an alternating current of perhaps 7,000 or 8,000 cycles is modulated by a voice current and this modulated high frequency current is transmitted through the system and then at the end of its journey is demodulated and restored to intelligible speech.

The carrier current system allows the transmitting of a large number of telephone currents, telephone conversations, over the same physical plant, over the same wires in the telephone company's plant and thereby saves the expense of the addition of wires as the traffic increases. I don't know whether carrier current systems are used in local exchanges.

In the course of research and development work, inventions are made upon some of which patents are secured. I neglected to mention the patent department in listing the departments of the Bell Telephone Laboratories. When [fol. 7669] we suspect or hope that we have made an invention the material relating to it is submitted to the Patent Department for appropriate action and there it is handled so far as the prosecution of the application for the patent is concerned. There is a Patent Department in the A. T. & T.

The engineering work of the Western Electric is carried on under some other name than Development & Research, but I don't know what it is.

Mr. John G. Roberts is head of our Patent Department and has been since the incorporation of the Bell Laboratories.

I don't know anything about the handling of charges in connection with that work. I have taken out several patents myself, a few on radio, I don't know how many. Our Patent Department keeps lists of the various patents secured and applications filed.

I know Mr. H. A. Appel. He is connected with Development & Research, A. T. & T. Mr. R. M. Allen was with the Western Electric Co. Mr. H. W. Nichols, who died about six years ago, was in the Engineering Department of the Western Electric. W. L. Betts is an employee of the Bell Laboratories. O. B. Blackwell, Development &

Research, A. T. & T. R. Bown same; O. E. Buckley, Bell Laboratories. G. A. Campbell, Development & Research, A. T. & T.; J. R. Carson, same. I don't know G. Cirsson. L. M. Clement was at one time in the Engineering Department of Western Electric; A. W. Kishpaugh, Bell Laboratories; E. H. Colpitts, Development & Research, A. T. & T.; I. B. Crandall has been dead several years, he was formerly in Bell Laboratories; A. M. Curtis, Bell Laboratories; H. C. Edgerton, at one time Western Electric, I don't know about him of late years; G. W. Elman, Bell Laboratories; C. R. Englund, same; L. S. Espenschied, Development & Research, A. T. & T.; A. L. Fitch was at one time Engineering Department, Western Electric; I don't know where he is at present time. J. O. Gargon, I don't know; A. Haddock was at one time Laboratories, I think not now; R. E. L. Hartley, R. A. Heising, M. J. Kelly, B. W. Kendall, W. H. Martin, R. C. Mathes, J. Mills, A. M. Nicolson were at one time in Bell Telephone Laboratories; H. S. Osborne, Operation & Engineering, A. T. & T.; H. W. Read was at one time Western Electric; I don't know where he is now; W. L. Richards, who died [fol. 7670] a couple of years ago, was with the Bell Laboratories; J. C. Shelling, E. O. Scriben, H. E. Shreeve, L. J. Sivian, E. R. Stoekle, H. N. Stoller, now or formerly with Bell Laboratories, H. J. Van der Bijl was at one time an employee of the Western Electric; K. S. Van Dyke, Development & Research, A. T. & T.; H. W. Weinhart, R. H. Wilson, W. Wilson, J. P. Schaefer, Bell Laboratories; P. I. Wold was at one time in Patent Department, A. T. & T.; also at one time Laboratories.

Practically all the patents that have been issued to me relate to telephone communication, the first ones to a telephone repeater known as the mercury arc repeater, and subsequent ones related to the vacuum tube repeater; do not recall them in detail. I am quite sure that these inventions of mine have been used in repeaters or in radios or in both.

I will check over and ascertain whether the following named patents issued to me relate to and are usable in radio:

No. 1,114, 845 of October 27, 1914, electrical relays.

No. 1,128,279 of February 16, 1915, electrical wave amplifier.

No. 1,128,280 of February 16, 1915, thermionic detector.

No. 1,129,942 of March 2, 1915, gaseous repeater and circuits of low impedance.

No. 1,129,943 of March 2, 1915, same title.

No. 1,329,283 of January 27, 1920, thermionic amplifier.

No. 1,349,252 of August 10, 1920, methods of and means for utilizing thermionic current.

No. 1,354,939 of October 5, 1920, vacuum tube devices.

No. 1,367,224, February 1, 1921, radio receiving system.

No. 1,375,481, April 19, 1921, power modulator for radio transmission.

No. 1,398,665, November 29, 1921, thermionic amplifier.

No. 1,403,475, January 17, 1922, vacuum tube circuits.

No. 1,231,984, July 3, 1917, H. W. Nichols and H. C. Arnold radio transmission.

A dollar is supposed to be given to employees for each patent taken out by them on inventions, but I have never seen the dollar.

(For deposition of George A. Campbell, see Abst. Vol. IV, pp. 1230-39.)

[fol. 7671] LYMAN F. MOREHOUSE, for defendants.

Direct examination.

By Mr. Haight:

I reside at Montclair, New Jersey; I am Equipment Development Engineer, A. T. & T., and have been since 1909; prior to that from 1906 to 1909 I was with Western Electric Co.; prior to 1906 for four years I was at University of Michigan on Physics and Electrical Engineering Faculty, and prior to that with Washington University at St. Louis for a year in the Department of Physics, doing instructing work. Prior to that time I was instructor in mathematics and physics and later acting principal of the Marquette High School, Marquette, Mich., and instructor in mathematics and other subjects in Detroit Central High School. At the University of Michigan I was instructor and later assistant professor of electrical engineering.

While I was with the Western Electric, for a few months, I was in the laboratories in Chicago and then I was sent by that company to London and was connected with the Lon-

don house for about three years as transmission engineer in Europe.

When I first came to the A. T. & T. from the Western Electric I was Equipment Engineer until July 1, 1919, when I became the Equipment Development Engineer, which is my present title. I am the head of one of the departments of Development & Research, A. T. & T. My so-called department may be called a division of Development & Research Department, being the Equipment-Development Division. The Engineering Department of the A. T. & T. did the work of the Development & Research about July, 1919. Prior to July, 1919 the Engineering Department of A. T. & T. included work of the character done by Department of Development & Research since 1919.

The engineers of the Equipment Development Division carry on studies either directly or through the engineers of Operation and Engineering as may be necessary to determine the needs of the associated companies for new central office and sub-station equipment—more particularly that part which has to do with switching and signaling. Studies are also made to determine what should be the requirements [fol. 7672] of new system equipment for apparatus in order that it can be effective and enable the Associated Companies to meet service problems in the best way. In general that relates to all switching apparatus, to the sub-stations apparatus, except transmitters, receivers and induction coils. Mr. Blackwell, the transmission development engineer, does work on the transmissions, receivers and induction coils.

The work done by my division results in equipment manufactured and sold by Western Electric. Our problem is to determine the requirements. After the requirements have been determined by my division for some new piece of apparatus or system or equipment, the next step is to determine the specific requirements which should be met. Then they are formulated and sent to the Laboratories which develop the apparatus or system required. When that work is satisfactorily done, it eventuates in equipment which the Western Electric manufactures for the Associated Companies.

The job of the Equipment Development Division is to determine upon requirements and upon the need for a new thing. We study all the needs of the companies in the field. We make investigations and studies. In some of those

studies we have occasion to call upon the Laboratories for some assistance because we cannot always tell beforehand whether a system that we may visualize at the start, is a practical sort of thing. But having gone through the necessary processes, we finally determine as to the requirements which are rather specific and definite enough so that the Laboratories know pretty definitely exactly what it is that we are trying to do. With that background and the requirements, they proceed to work out the system.

The process of setting up requirements gives contacts between ourselves and the laboratory so that they have a pretty good idea by the time the requirements are formulated. These requirements are definite and specific enough so that the laboratories can produce what is required. They then design or develop the system, the circuits, the switchboard, the apparatus.

For example, we might take the case of a switchboard, private branch exchange board, where in looking over the field we come to the conclusion that a different type would be beneficial to the companies. A study of the company's use of private branch exchanges of the types of things that [fol. 7673] have to do with private branch exchanges is made; in general, the features of the private branch exchanges, as to whether we want a lamp board, the size of the board, as to the capacity of the board, as to whether they should have tie lines from one private branch exchange to another private branch exchange, as to whether we should have long extension lines connected to that private branch exchange. All phases of the use of the private branch exchange are studied.

In connection with that we take into consideration the economic problems in connection with sales which is a fundamental part of our problem. From our relations with the field and the Operation and Engineering Department we have a pretty good picture of the number of private boards to be used when developed. We make an estimate and having determined what these requirements should be we then set them down as part of the requirements covering the development of the Private Branch Exchange. Those things then go to the laboratory, and in most all our problems we have consultations with the laboratories and finally there is nearly always a letter to the laboratory authorizing the development work, stating what we want to do, setting

forth the requirements in detail, which are the formal instructions to the laboratories.

The laboratories then analyze the problem, determining what seems to be required in the way of new circuits and new apparatus and lay their plans accordingly. The laboratories then develop that to the point where from the laboratory standpoint it appears that it will work. Then there is a review of what has been done to see whether the requirements have been met, whether our ideas of the cost of the board, of the performance of the board and of the future of the board have been met. I am speaking only of my division.

Sometimes we review that work with the laboratories. Sometimes we can answer the question from the results of the laboratory tests and from the work the laboratories have done—tests on apparatus and tests on circuits.

Cost estimates have been prepared to represent the manufacturing costs. Sometimes we go a little bit further and try out one in the field. If the results are satisfactory, a description of what has been developed is prepared. It is standardized and the Associated Companies through the Department of Operation & Engineering, A. T. & T., are [fol. 7674] advised. In the meantime the laboratories, when it is clear that that is the step we are going to take, proceed to prepare such information as is necessary for the Western Electric to manufacture the equipment which has been sent to them.

When I have said "standardize it," I meant standardize for the associated companies.

The Equipment and Development Division Engineers do not have to do with anything but Systems and Apparatus for the Associated Companies. When apparatus is standardized the Associated Companies buy it. The Equipment & Development Division does not do any work on by-products. I presume the Transmission Development Division may do work on by-products, perhaps the Outside Plant Division, although I doubt that.

Since 1923 there have been improvements in switching systems, in sub-station equipment and apparatus that we find in switching systems and in sub-station equipment. Prior to 1923 there were improvements in switching systems and in sub-station equipment all along the line. In the term "switch systems," include manual switchboards,

both local and toll, dial systems, panel and step by step, and private branch exchanges.

My division has studied prior to and since 1923 a little, the matter of broadcasting over wires, just as a matter of interest. A great many inventions were made in my division on which patents were obtained. They are coming through all the time; broadly, the switching and sub-station fields, which fields cover the entire scope of my division.

Some of the patents relate to the various features of the panel system and of the step by step system and of the manual system. Some relate to switching arrangements, some for apparatus and some to power plants. They are pretty generally scattered over the whole job.

The Equipment Development engineers have nothing to do with wire systems as such, but they have a great deal to do with apparatus which are used in connection with wires. The Outside Plant Development engineers have to do with wire systems. The Outside Plant Development Division is one of the divisions of the Department of Development & Research. The Outside Plant Development Division of Development & Research has to do with wires, cables and certain problems in connection with loading [fol. 7675] coils. The Transmission Development Division and the Equipment Development Division have to do with repeaters. The Transmission Development Division has to do with vacuum tubes and radio, of which Mr. O. B. Blackwell is the head. The Equipment Development Division had to do with the teletypewriter switchboard. No division had to do with talking movies. Television comes under Transmission Development Division. My own division directed the development of the teletypewriter.

(Note.—Stipulated that the signing by the various witnesses of their respective depositions and their swearing to them, are waived.)

Development work on teletypewriters began a number of years ago, twelve years or more. They are used by the Associated Companies for various classes of service and also in the long lines service. My impression is that the use of printers are used probably more by the Associated Companies at the present time than by the long lines and I feel that the use by the Associated Companies is going to grow very rapidly and they will use far more printers than the long lines.

In connection with my work, we study the needs of long lines for central office switching arrangements that the long lines use. The needs of long lines are discovered in the same way as we do with the Associated Companies, by studies and investigations which we make, also by problems as they present themselves, through the Department of Operation and Engineering and the Long Lines and the Associated Companies. We do not differentiate between the operating companies in our work as to long lines.

Service improvements in switching have resulted in benefit to long lines, such as switching systems and teletypewriters and arrangements that long lines use in connection with telegraph. The switching system means one or more switchboards worked out to afford a means for connecting lines together either local lines or local and toll, and such associated equipment as is required in central offices for the operation of switchboards and to give the kind of service which they are expected to give. I mean by that terminal room equipment. In switchboards we have improved signal arrangements, apparatus, cords, plugs, jacks, terminal room apparatus, cable inside the office, facilities to the long lines [fol. 7676] for connecting their switchboards to dial equipment where that is necessary, all of which have enabled the long lines to handle calls more rapidly and more accurately with less interruptions to service.

The determination that certain equipment originating with Development & Research Department, A. T. & T., and passed on to the Bell Laboratories is satisfactory, is done in our department and in making that determination we are in consultation with the laboratories and Operation & Engineering, A. T. & T., and we take advantage of every source or facility for making sure that we are all right. The man upon whom the responsibility of making the determination finally rests, is Dr. F. B. Jewett, head of Development & Research, A. T. & T.

The matter of making equipment standard is a pro-forma sort of thing. Systems are standardized by Development & Research Department, A. T. & T., having before it the ideas of Operation & Engineering, A. T. & T., of the Laboratories and any other department that would be helpful in reaching a conclusion.

There has been no occasion in my division to study broadcasting, except as previously stated.

Outside of the switching systems and teletypewriters I have spoken of I have worked upon repeaters and telegraph systems and telegraph operation, relating to long lines. Our problems with the central office equipment are just the same there as with local companies' equipment,—the study of the needs and development of the apparatus that is required to enable the long lines to give service in the best way possible.

Men in my department have taken out patents having to do with repeaters, teletypewriter systems, carrier telegraph systems and practically connected with every general class of central office apparatus.

Our particular job in my division in connection with repeaters is to get them into the telephone system; that is to provide such switching and such signalling arrangements and associated equipment arrangements as may be necessary to get the repeater transmission circuit into the system. My attention lately has been, broadly speaking, devoted to two kinds of repeaters, that is, the one that is used in the telephone plant and the one that is used in the tele- [fol. 7677] graph plant. A telephone repeater handles the voice waves with or without a carrier. In telegraph systems some of the repeaters handle the high frequency waves very much as telephone repeaters and the telephone voice waves, but there are other types of repeaters where we do not use carrier,—those are the older types. At the present time in telegraphy there is a carrier repeater and an ordinary repeator made up of relays.

My division does not have anything to do with cables for long lines, but we do have cable wiring inside the central office; nor does my division have anything to do with loading coils. In my division we do not charge any one for the work that we do. Time is allocated to classes of work. There may be one or more jobs in each class, such as central office panel system circuits as one class, panel system apparatus another class. There are six or seven main classifications to which we charge the equipment development work and these classifications are subdivided into one or more subclassifications as may be necessary for administration purposes. The main classifications are central office equipment and circuits, substation equipment, wire transmission systems, work in connection with patents, etc. With some minor modifications, the classifications above mentioned have been used for five or six years. Prior to

that we did not have classifications of that kind or of that form. We kept track of our work, of course.

Our patent department may ask us from time to time specific questions in connection with patents. That classification, however, is not a large one so far as expense is concerned. The work of our division relates only to those matters generally handled.

Referring to wire transmission systems, there is no division as to that for long lines or for local toll or anything of that sort, nor is there any division as to switchboards, and that is true throughout.

Development & Research, A. T. & T., does not publish any magazine or journal. From time to time, however, engineers of the department publish articles and those are published in proper journals and there is a journal in the Bell System in which some of these articles are published, the Bell System Technical Journal. I have made inventions that have matured in patents in one or two instances. They had to do with printing telegraphs.

[fol. 7678] Patents are handled in this way. We prepare a description of the piece of apparatus or the equipment or the system, whatever it may be, and that is transmitted to the Patent Department, A. T. & T. Mr. Folk is head of the patent department.

Some projects took some time before they matured into commercial devices manufactured by the Western Electric. Depending on the particular matter, it may take a month before a job is finally completed, or it may be several years, as, for instance, the development of the dial system. It may take all the way from a week to a couple of years from the time my division starts work on a project before it is finally turned over to the Laboratories. I don't recall any at the moment, but I presume that there are some that took more than a couple of years.

Some of the projects that are undertaken in my division fail, but they are very few. They don't get very far. An idea may disappear by the end of the day or within a week or a month. I don't recall any project turned over by my division to the Bell Laboratories that has failed.

I couldn't give any idea of the number of projects started in a year that fail, or the number that started during the same year and succeeded; nor could I give any idea of the number that are started in a year that fail to go to the Laboratories and of those that do go, I would have to go

to our records for that. Generally we keep records of all our projects, of those that fail as well as those that succeed, but we have no system of classification as to failures and successes. All of our development projects go into those general classifications that I spoke about. A project may be a very large one or it may be a very small one. Some years we may have a predominating number of relatively small projects with a few large ones. Some years all the projects might be very important, but we might have as many as 10, 20 or 30 projects during the year in my division.

The records are kept in the department's office and I think there are lists of projects classified in some way as to subject matter, but I cannot answer definitely. The records are kept by Mr. Shepard.

For development & Research of the A. T. & T., the men are recruited from the associated companies, long lines, universities and the Bell Laboratories. That has been true [fol. 7679] as far back as I can remember. I don't recall ever having transferred any men from my division to Western Electric. Some of our men go to the Bell Laboratories. I am not certain whether any go to E. R. P. I. I think we lost one man to it or Graybar several years ago.

I am called upon occasionally to examine devices or processes covered by patents that are purchased by units of the Bell System,—Western Electric. We have not done any of that work, however, for some time. Our Patent Department might ask our views as to patents in question and we would attempt as engineers to determine what value the system described in the patent would be to the Associated Companies. I have looked into the merits of patents of the Automatic Electric Company. We would examine the patents and get as good a picture as we could of the system described in the patents. We did not make any experiments. We also looked into patents of the Kellogg Switchboard & Supply Company, and we examined the merits of patents for the Western Electric coming from Herbert N. Friendly. We made an examination of the patents to determine whether the arrangements described therein would be of value to us in our work.

I think we were asked by our Patent Department for our views about certain patents of the Stromberg-Carlson Telephone Mfg. Co., and of the North Electric Company.

The Western Electric manufactured devices embodied in

patents that I examined, as above mentioned. For example, apparatus of the step by step type embraced in patents of the Automatic Electric Company relating to machine switching.

I did not attend any conferences in 1919 respecting the organization of Development & Research, A. T. & T. Work such as has been done by Development & Research, A. T. & T. since its organization was prior to that done by the Engineering Department, A. T. & T. The general plan of carrying on our development work was substantially the same as it is now.

My duties as equipment engineer prior to July, 1919, were the same as now, except that since July, 1919, I have had additional duties relating to central office and sub-station equipment. We look to the Bell Laboratories to determine that a device found to be workable can be manufactured from a practical standpoint.

[fol. 7680] Mr. H. A. Appel is connected with Development & Research, A. T. & T. in the Transmission Development Division. Mr. O. B. Blackwell is head of the division. Mr. R. Bown is in the Transmission Development Division. Mr. G. A. Campbell is Research Engineer, Development & Research, A. T. & T. J. R. Carson is Transmission & Development Engineer. E. H. Colpitts is in the Development & Research; don't know G. Cirsson or H. C. Edgerton. L. Espenschied is in the Transmission Development Division; don't know J. O. Gorgon or A. Haddock; I think Mr. A. H. Nicolson was with the Bell Laboratories at one time. H. S. Osborne is with Operating & Engineering, A. T. & T. I don't know H. S. Read. H. B. Shreeve is with Development & Research; I don't recall K. S. Van Dyke. P. I. Wold formerly was with the Bell Laboratories and later with the Patent Department, A. T. & T.

There are no publications of Development & Research, A. T. & T. However, there is a Bell Telephone Quarterly and the Bell System Technical Journal, wherein articles written by engineers in Development & Research, A. T. & T. are published.

OTTO BERNARD BLACKWELL, a witness for the defendants:

Direct examination.

By Mr. Haight.

I reside at Plandome, Long Island; I am Transmission Development Engineer, Development & Research Department, A. T. & T. and have been since the formation of that department in 1919. I attended no conferences at that time relative to the organization of that department. For a number of years prior to the organization of that department I was Transmission Engineer of the Engineering Department, A. T. & T.—from about 1914 or 1915. Before that I was just one of the engineers in the department, entering it in 1906, immediately upon graduating from Massachusetts Institute of Technology in 1906 with degree of bachelor of science in electrical engineering.

From 1906 until I became Transmission Engineer I was working on various jobs having to do with transmission. [fol. 7681] When I became Transmission Development Engineer of the Development & Research Department, A. T. & T. the work of the department I headed was divided and I only kept that part that came under Development & Research Department, the engineering work going over to Operation & Engineering Department, A. T. & T. The latter department has to do with advising the field, keeping in general touch with the field and advising them on the problems which arise in their work and on which they think they want advice. I have contact with that department as through them we get part of our information as to field conditions and needs. That department contacts us when some matter may be referred to them on which they want some advice from the development standpoint before replying.

The work of my division of the department of Development and Research covers generally transmission waves—waves and impulses which transmit communication. In the telephone field we are interested in the waves which are used in transmitting speech, starting with the formation of those waves by the talker, that is, the subscriber who is talking over the telephone circuit; in the transformation of those waves into corresponding electrical forms and as they go out over the various types of circuits and finally when they reach the receiving end, transformed into sound waves again and are listened to or observed by the listener. In

connection with other phases of communication like telegraph we are interested in the transmission of the waves and impulses which carry the communication.

That work in the telephone field has to do with existing telephone apparatus, and with proposed apparatus. Some of our work has to do with the apparatus used in the long lines department. The same is true of new or proposed new telephone apparatus. The same is true of telegraph apparatus.

I should say my work also has to do with operation as there is practically nothing done that affects the telephone business that does not have something to do with operation.

My division has to do with originating of new or proposed new apparatus. Our ideas come from other sources than our own division, such as associated companies who may feel a need in their work; from Operating & Engineering Department, A. T. & T., who may see a need for new [fol. 7682] propositions; from the laboratories whose work may have opened up possibilities which have not been seen before, and they may come from our own work. So far as I know, none comes from Western Electric. However, they may indirectly through the laboratories, but I do not have in mind any case that arose in the Western Electric as coming to us resulting in originating any work.

The men in my division are recruited largely from schools and universities and teaching staffs of schools and universities and some from Associated Companies and one or two from the laboratories. There have been cases where we thought men with the experience that they had in the operating companies would be helpful to us in working out the particular phases of the work with which they had had experience. We surely would not have chosen men that we did not think had pretty good ability—ability, knowledge and experience.

My division has been interested in telephotography—in the transmission of impulses which correspond to the picture, as these impulses are transmitted over the circuits and also as they are handled in the apparatus at the terminals. That work has been going on four years at least, so far as it has been active. There is a system of telephotography in operation at the present time that connects eight or more of the important cities of the United States, so that mes-

sages delivered at any of these can be delivered at any of the other eight cities. The long lines department operates it in this part of the country. On the Pacific Coast it is operated by the Pacific Telephone & Telegraph Company.

Everything we do comes under the fields of telephony and telegraphy. Telephotography can be considered a form of telegraphy in many ways. In telephone work we are interested in many matters which you may not have in mind as telephone, as, for example, sound recorders, that is, devices by which sounds either right at the source of the sound or sounds which may be received over telephone circuits, are in some way recorded either on mechanical medium or on film or otherwise, so that these sounds can be later produced.

In testing circuits in the laboratory particularly, it is necessary and it has been necessary in the past, to have groups of men, crews we call them, who talk over these circuits and then we have listeners who listen to these cir- [fol. 7683] cuits, and by recording various things, such as the judgment of the listeners as to loudness or recording the mistakes made by the listeners, we may judge the circuits. This has not been entirely satisfactory, because voices vary so much from time to time, so that we have in the last couple of years gone onto a system which is now in use involving what we call an artificial voice and ear proposition. Instead of a speaker it uses a phonograph record, and records can be produced entirely satisfactorily now. Of course they are always the same, so there is no variation, as is the case when we have human beings and this voice is sent out through devices which, for the purposes of talking into our instruments approximate the effect of the human mouth and we use that method in testing our circuits.

We have considered in quite a little detail and we have done quite a little work on a proposition that has arisen a number of times, which has in mind the use by subscribers of devices which record conversations, which go on over the telephone circuits they are using. That has not been used in the long lines. The only uses that I know of at the present time are in connection with certain power companies who are using it on, as I understand it, what they call their load dispatching circuits. It is my understanding that the control of the different stations supplying power is cen-

tered, for example, in some point, and if anything goes wrong, they want to be able to fix responsibility for the incorrect orders that may have been issued.

I have had nothing to do officially with electric phonographs for broadcasting stations. Some of our people make a particular point of keeping in contact with all the work that is done both inside and outside of the company, to see if there is any use that we can find for them in connection with our work or the work of the associated companies.

There are other cases of uses coming under those two categories but, so far as I can recall, the only two types of things for which we have considered these are recording in connection with telephone service and testing methods.

I have had no work to do with respect to the Victor Orthophonic Phonograph. I have had to do with television as we are interested in the transmission of the electrical impulses which correspond to the pictures as they are transmitted over the wire. Also, in connection, for example, with demon- [fol. 7684] strations such as that which was made between New York and Washington on television, it was the people in my department who were responsible for the wire arrangements that were set up between New York and Washington and for the changes that were made in the lines to fit them to transmit these rather high frequencies. We have to distinguish between when it actively began and when there were ideas which were in the department because of either originating in the department or coming to us from outside. The active work on television was in comparatively recent years. I would estimate four years.

We kept in touch with every form of communication. Personally I have read articles and have had some interest in both picture and television, which grows out of pictures in a way, ever since I was in the telephone company as far as I can remember.

I cannot say definitely as to whether our division, up to four or five years ago, did anything about television except to read articles. It is almost certain that we did do a certain amount of imagining or perhaps inventing. There may be patents that go back that far. In keeping in contact with these outside possibilities we always consider whether they have any application and it is not possible to determine whether they have some application without making some

sort of a study but I think that our studies were, so far as I remember, not particularly formal prior to that time. I am not sure about that. It may very well be that we have in our files activities going back quite a bit prior to that date.

I do not remember any experimentation with television going back more than four or five years. Television was first used two or three years ago. Of course, the Washington demonstration was a demonstration of a system that had necessarily taken a considerable while to devise and construct. I do not know how many years. That apparatus gets back into the laboratory work and what they may have had there I don't know. That came under Mr. Arnold in the laboratories. I had contact with Mr. Arnold's work in the laboratory ever since he has been in charge of the work up there.

As far as my memory goes, that work on television had not reached the stage, either down here or in the labora- [fol. 7685] tories, where it had resulted in our discussing it with Dr. Arnold formally until about the date that I mention it as being an active matter, four or five years ago.

I have no distinct memory of informal discussions with Dr. Arnold. The only work that we have done on it prior to those discussions was a general matter of keeping in contact with all communication matters. I have no remembrance of any contact with any one relating to television prior to this time four or five years ago.

As to whether there are any records, if there had been anything that resulted in any formal contact, it may have resulted in a letter. If so, that would be in our files.

In our division we have a work classification at the present time which we use and each of our people keeps a record of the amount of time he spends each day on each of those classifications. These records are by years. We do not classify them by projects. In times past we had work orders somewhat similar to the laboratory work orders. That was changed about five or six years ago. I don't know how long that system existed prior to five or six years ago. Such records as I have made are still in existence, so far as I know. Mr. Shepard or his department has them.

My division has done work upon radio, two types of work. Certain work has had to do with the stations themselves in so far as radio has led to stations; certain work

has had to do with the question of starting the various radio cases, the originating of the cases, the authorizing of the cases which are similar, of course, to what we do in connection with other matters.

Undoubtedly our people have developed inventions concerning radio. I think an invention was made by one of our people on what we call the single side band system of radio transmission.

I believe there have been antenna inventions which our people have made.

Mr. H. A. Apfel is in my division. He has made a good many inventions, but I don't know of any inventions he made relating to radio.

I am a joint inventor of a system for controlling carrier or a standard frequency.

I know Mr. R. Bown. He is connected with my division. I don't know of any inventions that he made. He has been [fol. 7686] working on radios many years, but I don't have in mind the invention. I don't think any research work was done on his inventions. My invention or joint invention was limited to a radio wave—a standard radio wave which was received by radio stations, used as a basis. There has been work done on stabilizing radio stations by transmitted waves. I believe, however, that that comes under other inventions. It would be a patent matter as to whether my particular invention or some others bore on the particular systems. There has been work, however, on stabilizing radio channels by transmitted waves, transmitted standard frequency.

I don't remember who the other joint inventor of my invention was. He was in my division. I think the invention was made seven or eight years ago, I am not sure about that.

I know G. A. Campbell who made the filter invention and antennae array invention. On filters there has been a good deal of experimental work done. We did not do the experimental work on filters other than in the sense that when the development involving them gets out into the field, we take a part in the practical tryout, but I think what you have in mind is the laboratory function.

J. R. Carson is in my division in charge of a small group who do theoretical work largely, mostly mathematical; he has made the invention relating to radio—single side band

method of transmission. I think he did some work on selective circuits, but I have no definite remembrance of any other invention of his.

There are about 125 men in my division. We have hired no men in the last year or two. I think we have lost one or two, perhaps three. I cannot definitely state whether the number has been larger than at the present time, perhaps one or two.

Mr. Colpitts is in general charge of Development & Research Department, A. T. & T. under Mr. Jewett. He has made inventions relating to radio but there was no research work in my division respecting those inventions. His invention was a modulating circuit and the research work was done in the laboratories regarding that. That is the only invention of his I recall.

Mr. Espenschied is in my division and he has made a good many inventions. I don't recall any at the present time. I [fol. 7687] would have to refresh my memory as to what development work was done respecting his inventions.

When inventions are made in my division I frequently have something to do with transmitting information respecting them to the Patent Department. However, they don't always come through me, they might go directly to the Patent Department, but they usually come to me for transmission in the form of a memorandum stating what the idea is. I do not personally keep copies of those memorandums but they are kept in the files of the general department, not of my division.

We have no records at the present time which I would say was a project record. Each case that is sent to the laboratories and authorized to go forward is covered by a letter and a copy of that letter is in our general files and then we have reports which our people make from time to time of the work that they are doing in different classifications; also, many of those go into the general files but we have not a case classification, a project classification such as laboratories have.

We have records of everything of any size that go to the laboratories from my division. Projects or work performed in my division that do not go to the laboratories generally leads to bulletins for the field, and we have lists of such bulletins.

Our fellows have ideas that are turned down before they reach the stage of being sent to the laboratories. Some of our patents cover matters that have not resulted in practical apparatus, but there is no attempt to keep a record of dead ideas. There is no record or list of all the projects that have been worked on in my division. The only list we have is this work classification which goes down in some of the divisions to fairly small matters, but below that point we do not go into individual projects. When we had some of these work orders, I don't know whether they were listed; I assume they were. All records are kept by Mr. Shepard.

Our expenses are budgeted somewhat prior to the beginning of each year. Our work is not budgeted. The work classification is the basis for that budget. The budget includes a number of factors. The first and the chief factor, of course, covers the men's time and on that Mr. Shepard sends to us sheets on which he asks us to put down for [fol. 7688] these various classifications the expenditures we would expect under those classifications for the following year. He also asks for any estimates that we can make as to billings in connection with experimental work, but the big item is the men's time.

I don't know that I said anything about sound pictures. We have done no work on sound pictures. I am talking about my department now. Of course some use has been made of sound pictures by our publicity people, but there has nothing been done in my department on sound pictures whatsoever.

My division had to do with the development of some of the principles upon which sound pictures are made. Loud speakers are an important part of sound pictures and loud speakers have been a matter in which we have been interested. Our work on loud speakers in my division has been with respect to their application in the telephone service. In connection with loud speakers we had the same responsibilities that we had in connection with other matters in attempting to see what use they had in the Bell System and in the authorization of certain work by the laboratories on them. Our department has been interested in various demonstrations in which we have been responsible for the loud speaker phases of the demonstrations.

My contact with sound pictures has been largely in con-

nection with hearing demonstrations of sound pictures and there have been loud speakers used in all those demonstrations, so far as I can recall, that I have ever listened to. I had nothing whatever to do with the principles on which the Victor Orthophonic phonograph is based. The Orthophonic Victrola has nothing to do with telephony. I don't have in mind any work which we authorized which bore on the phonograph proposition which led into that orthophonic victrola.

I do not doubt that I employ the word "principles" frequently, but it is not a word that has any narrow meaning or any specific meaning. What we mean by it is generally shown by the context of the statement in which we use it.

As to whether there is any principle in any sense that I might employ the word used in telephony, I might say that electro magnetism was a principle used in telephony. It is employed in telegraphy, in radio, and in certain types [fol. 7689] of phonographs which we worked upon, that the laboratories have worked on at our request.

The phonograph itself was a mechanical phonograph in which certain refinements had been made in connection with the reproducing apparatus. I do not know what you can put your finger on and say that was the principle of it.

Neither the A. T. & T. nor any of its departments supplied anything to the Victor Orthophonic Phonograph directly. The recording used electro-magnetic waves and there may have been some indirect contribution from the fact that we use transmitted speech in telephony and this recording used transmission of speech. I don't know whether the Victor Company has any arrangement with A. T. & T. or any subsidiary of it.

There is nothing in my division that we know of as by-products. I have heard the word by-products used in connection with some of the devices that are sold by the Electrical Research Products Corporation. Our only contact with them is that we make it a rule—some of our people make it a rule to keep in contact with every new device of that kind that is put out in order to determine whether there is anything there that might find a use in our work or in the Associated Companies' work. That is the only contact we have with the by-products. So far, however, as recording apparatus and loud speakers and some of these other matters you have mentioned, as I recall them, having a field of

application in the Bell System, we are very much interested in them.

As to which one of the by-products I have had anything to do with in a[illegible]wise, you have indicated the phonograph. I should say they are not by-products in so far as we are interested in them, but we are interested in voice recording loud speakers or pick-up transmitters or transmitters in general. Those are the three things I have in mind.

As to any other by-products with which I have had to do, I would mention deaf sets to help subscribers who may be hard of hearing. Of course in voice recording I include voice recording and voice reproduction.

I only know what E. R. P. I. puts out by the fact that I see some of their products. Its largest production is on motion picture talking devices and sells phonograph devices [fol. 7690] of various kinds for certain purposes. I have come in contact with its deaf set apparatus. That is all I recall now. The talking moving picture apparatus was worked upon in the laboratories or at that time the Engineering Department of Western Electric. My division contributed nothing to that direct. If there has been any contribution it has been through the fact that we have contributed to the general telephone art. We have contributed to the general matter of better quality service, better quality telephone service and to what extent the laboratories may have drawn on anything that we may have contributed I haven't any information. We have been responsible for inaugurating certain work and I think undoubtedly some of our people have contributed definite features on amplifying devices.

In the application of amplifiers to a telephone plant there are many circuit arrangements and adjustments that have to be made. Our people have contributed a good deal in connection with those matters. For example, the matter of balancing lines which is an integral part of every repeater, I guess practically every repeater we have. Our people I know have contributed a number of inventions in connection with filters, electrical filters which are playing an important part in our telephone service in connection with carrier, radio, and such matters.

I do not have in mind any single instance where any invention arising in my department was used or embodied in any of the by-products.

The contribution of amplifying devices to talking motion pictures was of considerable importance. As I understand the talking motion picture, the recording as it is taken off of the film is amplified considerably before it is used to actuate the speaking devices.

My division had to do with repeaters. We have had to do, first, with the originating of many of the cases, many of the developments that have been carried out and we have had to do a good deal with the application of these repeaters in the plant. We have had to do with the writing of bulletins to furnish information so that the Associated Companies could use these repeaters to the best advantage in their plants.

The particular case of developing a hearing aid for telephone users, the general case was handled by the equipment [fol. 7691] people, but we acted as consultants with them and with the laboratories on the amplifying device that is used in connection with it. The stethoscope was not one of the hearing aids, nor were audiophones.

My division has had to do with testing apparatus for submarine cables. There has been work giving a great deal of attention in the last few years to a telephone cable to Europe to permit a telephone circuit all wire from the United States to Europe. In connection with that work there have been tests carried out of various features, such as noise, for example, on experimental cables. There have been tests carried out in the laboratories on artificial cables. We have been, of course, interested in all of those.

My people have not had any large part to do with the particular testing apparatus used, although they may have suggested some features of it and then kept in general contact with it. My people have used such testing apparatus on the cable from the United States to Cuba. Other tests I have in mind were almost completely made by laboratory men.

There are a good many things which the Bell Telephone Laboratories or the Western Electric has developed in the telephone field as a result of work in my division. By telephone field I mean the business of the Associated Companies.

Most of the work that I have connection with is too complicated to permit you to put your finger on one part of it and say that that is the thing that led to a certain result. In every case there are a lot of contributors to this thing, and

furthermore, these various contributions are so many that they become submerged, in general, in our consideration of a thing, and we do not think of these things as being John Smith's thing or somebody else's thing. But my department has contributed undoubtedly, surely, to every big job which the department has had contact with. For example, long cable circuits, including what we call four-wire cable circuits, application of repeaters to open wire plant, carrier telephony and telegraphy, in both open wires and cables, sub-station apparatus, program transmission over telephone circuits. In each of these cases, you will understand I am not mentioning them because in all I have in mind a [fol. 7692] specific element contributed by a particular man in my department, but because they are all the big matters on which they have been actively employed. I think we can go ahead with the list.

Radio, telegraph, echo suppressors, automatic gain control devices, telephone and telegraph testing apparatus. These include, of course, repeaters that we have mentioned as parts of them. I think that covers the thing broadly. Of course we could break such matters as long cable systems down to parts and enumerate some of these parts.

I would also include telephotography. Television, however, is not in commercial use; also I would include voice recorders, but I think our people have contributed some thoughts to that. As to whether I would include talking pictures, I would say that is much less likely as our inventions are more likely to come from the question of the application.

In the voice recorder I should imagine our suggestions or our inventions would come in the applications which have been considered rather than in the physical recording or physical reproducing itself and it seems to me unlikely that any suggestion that has come from our people has gotten through in the talking motion pictures.

The thing I definitely have in mind with respect to amplifiers are the application devices which fits them into the telephone system, that is, the artificial line arrangements and the filtering arrangements. Stripped of these application devices, that is, the pure amplifier, as such, is almost wholly a laboratory proposition. Now it may very well be that some of our people have made suggestions that have helped in connection with such amplifiers, but the ampli-

fying device itself is pretty largely, almost wholly, so far as I now definitely have in mind, a laboratory development.

We have used what I assume you call public address systems in various ways, and it may be that some of our people have made suggestions in connection with that. I have not in mind at the present time anything that definitely is incorporated as a feature in public address systems.

As to the records in my department of work done, we have not gone below the classification. Radio, of course, is a main classification, but under "radio" you will find subclassifications, such, for example, as "ship-to-shore" and "trans-Atlantic" and a number of classifications of that kind. [fol. 7693] Below that, however, we do not go with a definite routine. The individual job, as I understand it, would be covered by correspondence. There is always a definite organization letter for that to the laboratories. There is no formal list of cases below these divisions that I use.

Mr. Blackman: There is a sheet made up every month and summarized every year of the expenditures of the Department of Development and Research, which divides the work into 19 main divisions and each of those divisions is divided into two or three subdivisions, which will give you the work broken down into more than a hundred different classes. For instance, take "radio," there are probably, as I recollect it, ten or a dozen divisions of radio, as Mr. Blackwell stated, such as "ship-to-shore," and this, that and the other thing, under radio. Now, I have some of those sheets and I have had one or two of them enlarged, because they are made very fine and are hard to read. If you would like those sheets, I would be glad to let you see them.

We have given to Mr. Wray some books that contain lists of projects, I think they are by number.

Mr. Blackman: You can have anything that does not disclose certain matters that we are working on at the present time. Of course, Mr. Haight, as a patent attorney, will understand that matters that we have in mind at the present time, we do not desire to announce to the world, what we are working on.

Mr. Haight: And we do not wish to pry into those matters at all.

Mr. Blackman. We will be glad to give you a list of all the projects except those, and any book that contains no project

of that kind, we will give to you, and if a book contains a project of that kind we will take it out and indicate that we have taken out the project, because it was of that character.

Mr. Goldstein: Will those that you take out cover all the activities of Electrical Research Products?

Mr. Blackman: I don't know what they are working on.

(Discussion off the record.)

Mr. Blackman: Where we have a number of dollars (I heard you mention that to Mr. Haight), where we have a number of dollars spent each year, we break that down into some subdivision.

[fol. 7694] Mr. Goldstein: The number of dollars you spent in each department, have you got those covered in those projects?

Mr. Blackman: Not for Mr. Blackwell's department, but we have it for the whole D. & R. Department.

The Witness: There is no separate budget for my division, and I am surprised if Mr. Morehouse testified that he had. There is no budget by divisions in my department. In making up the departmental budget, we furnish Mr. Shepard an estimate of how much money we think we shall want to spend in each of the classifications and it goes down to sub-classifications,—in each of those sub-classifications, we advise how much we shall want to spend, but we don't go below those classifications.

Dr. Frank B. Jewett, for the defendants:

Direct examination.

By Mr. Haight:

I reside at Shore Hills, New Jersey. I am vice-president of the A. T. & T. and president of Bell Telephone Laboratories, Inc.

I was graduated in 1898 from Throop Polytechnic Institute of Pasadena, now the California Institute of Technology, with the degree of Bachelor of Arts in Electrical Engineering. I received the degree of Doctor of Philosophy from the University of Chicago, in physics, in 1902, and was research assistant under Prof. A. A. Michelson; that was in 1901 and 1902.

I was instructor in physics and electrical engineering in

the Massachusetts Institute of Technology from 1902 to 1904.

I entered the employ of the Engineering Department of the A. T. & T. in fall of 1904, but a year or so subsequent to entering that employ I became transmission and protection engineer of A. T. & T., which position I held until spring of 1912, when I became assistant chief engineer of Western Electric; I became chief engineer of Western Electric in 1916; its operating vice-president in 1922 and in 1925 I was transferred to my present position.

The Development & Research Department of the A. T. & [fol. 7695] T. was organized about middle of 1919, but I am not very clear on that because I was not with the A. T. & T. at that time.

From 1907 on, all the laboratory work of development and research for the Bell System was carried on in the Western Electric in its Engineering Department and that was substantially of the same nature as those which are now carried on by Bell Telephone Laboratories, which is merely an outgrowth of the Engineering Department of Western Electric.

The Western Electric carried on in its engineering department all of the physical development on the problems which were presented to it by the Engineering Department, A. T. & T. and in addition it carried on, on its own behalf, such problems—the research and development of such problems as had to do with articles of its own manufacture, in which the American T. & T. and the associate companies were possibly only indirectly interested. By that I mean research and development to cheapen the cost of apparatus which was then standard, which kind of work could be undertaken by a manufacturing department without reference to its customers, provided it did not change the character of the apparatus to be furnished. It undertook fundamental research work at the instance, largely, of the American Company looking to the development of new, fundamental information which was applicable in the telephone business. It undertook the development of new central office and substation apparatus and equipment and the circuits which were used in the telephone and telegraph business and it investigated materials which were employed in the construction of that kind of apparatus. It investigated such things as cable structures, telephone cable structures, in fact, it undertook research and development work on the physical side in

everything which pertained to the communication business.

That would include such subjects as transmission equipment in so far as it related to physical things as distinguished from the operational types of investigations which had to do with the use of things. Western Electric during those years substantially did not do any work of the characted done now by the Development & Research Department, A. T. & T. From 1907 on, work of that type has always been done in either the Department of Development [fol. 7696] & Research or in its predecessor, the Engineering Department, A. T. & T.

Prior to 1907 the set-up in the Bell System was somewhat different. The American Company had laboratories of its own in Boston and the Western Electric Company, the manufacturing part of the Bell System, had laboratories both in New York and in Chicago, and in those laboratories it conducted somewhat in parallel some of the work or work of a similar character to that which was done in Boston, but in 1907, at the time the Engineering Department of the American Company was removed from Boston to New York, the whole scheme of research and development work in the Bell System was reorganized and all of the physical or laboratory work was concentrated in a single laboratory in the Western Electric's Engineering Department in New York and all of that part of the work which related to contact with the associate companies on the development of new things or in the study of fundamentals from a theoretical standpoint was concentrated in the Engineering Department, A. T. & T.

It would not be exactly true to say that the Engineering Department, A. T. & T. took over in 1907 the Development & Research functions theretofore performed by Western Electric.

It retained all of the functions which it had had for many years prior to that, but did take over that part of a similar work which had been done in the earlier days in the Western Electric.

In the very early days the associate companies were in direct contact, with regard to new things, with the Western Electric as well as with the American Company with the result that there was a certain amount of development work on physical apparatus which was carried on by the Western Electric as a result of its direct contact with the associate companies without much reference to the American Com-

pany, but about 1907 it had become evident that the best interests of all the associate companies would be served by concentrating the consideration of new things so as best to serve all of the interests, including the Western Electric, which by that time had gotten into the position where it was manufacturing a wide variety of things almost identical, but not quite, because of the different way in which the [fol. 7697] requirements had come up to it.

A large part of the problems going to the Western Electric then came to it from the Engineering Department, A. T. & T. That goes far back of the time when I first came into the business, but I should imagine from the early times a large part of it went directly to it from the A. T. & T. Prior to 1919 the A. T. & T.'s problems from long lines and from Bell subsidiaries went to Western Electric for solution through the Engineering Department, A. T. & T.

I might qualify that to this extent, that with regard to specific orders for equipment, if there were minor problems involving variations from standard equipment, those might appear first in the Western Electric because they were the recipients of the orders, but the solution of those problems even at the time you are mentioning involved consideration by the Engineering Department, A. T. & T.

The Bell Laboratories, Inc., was organized at the beginning of the year 1925. Broadly, it carries on all of the work which prior to January 1, 1925, was carried on by the Engineering Department of Western Electric, and it conducts the Research and Engineering work for the Bell System as a whole, including the A. T. & T. and the Western Electric.

The Department of Development & Research, A. T. & T. is charged with the responsibility, the primary responsibility for the Bell System for providing new and improved things or methods for the Bell System. In carrying out that work it is charged with the responsibility of studying the needs of the associate companies as those needs develop through their growth and the growth of their business. It is charged with the responsibility of keeping in touch with the progress of science and engineering generally, not only in the Bell System, but throughout the world, and where physical things are required, of formulating the requirements to be submitted to the Bell Telephone Laboratories for solution in the laboratories. The Department of Development and Research maintains no laboratories. It is

charged further with the responsibility of keeping in touch with the development work as it goes on in the laboratories and at the conclusion of a development project, specifying whatever service tests may be required and finally of approving of the thing which has been developed, to meet the requirements that have been set up, and when it has ap- [fol. 7698] proved those things, of doing the necessary acts to make them standard in the Bell System and of furnishing to the associate companies, through the Department of Operation and Engineering, all necessary information which will permit the associate companies and the Long Lines to order this equipment and to operate it when it has been installed.

The new and improved things that I mentioned include new and improved things for all parts of the Bell System. The new and improved things that are finally approved, if they involve physical things, find their way into the Western Electric either for manufacture or for supply. Some of the things involve physical things which the Western Electric does not itself manufacture, but which it does supply to the associate companies on order. An example of that is power machinery. The Western Electric does not manufacture power machinery, but it does supply power machinery to the operating units of the Bell System.

Development & Research Department, A. T. & T. has nothing whatever to do with originating ideas in relation to so-called by-products. The ideas that are developed by Development & Research Department, A. T. & T. come from the world of science and engineering generally. They come from common knowledge which is derived from publication of scientific work or the less common knowledge which comes through the contact which we maintain with operating communication units throughout the world or with scientific laboratories throughout the world. They come from the needs of the operating units of the Bell System as the need for new things develope and we learn of them either through our direct contacts with the operating units or more generally through the Department of Operation & Engineering, which is in very intimate contact with the associate companies. They come also from the general knowledge of the telephone business which the members of the Department of Development & Research, who are acquainted with all phases of the physical side of these things; they come also from the new knowledge which is developed

through the physical research work in the Bell Telephone Laboratories itself, which new knowledge very frequently suggests new applications or new methods of applying knowledge to old things. I think those, in general, are the [fol. 7699] main sources of the problems as they develop in the Development & Research.

For the most part the men in Development & Research Department, A. T. & T. are, and probably to a larger extent than in almost any other department of the system, college or technical school graduates. They are trained scientists or engineers. Some of them come direct from selection from graduates, from the great universities and technical schools, who have entered the department immediately on graduation either with their baccalaureate degree or their advanced degrees. Some of them have come from the other departments of the business. The operating companies—operating units and I think in some cases a few have come from the laboratories. In all cases, however, they are men who are selected because of special qualifications for the kind of work which has to be done here.

In general, except for the men who come directly out of college, they are men who have had training and experience in some particular line.

I doubt if there is any single place where you could say that you could get the most information of the development work of the Bell System over the past. The system is too vast, and the kind of things are too diverse to be assembled in a single repository. You must realize that you are dealing with an organization involving hundreds of thousands of people engaged in all kinds of problems. So far as the physical needs are concerned, knowledge relating to the underlying principles and to the structure of those things I presume you could find most of them in the Department of Development & Research and the Bell Laboratories. When you come to operational methods and things having to do with the daily conduct of the business, I presume that the Department of Operation & Engineering, A. T. & T. would be as good a repository as you could find. When you come to matters of detail of constructing the physical things, it would be the Western Electric. But there is no central repository in which we attempt to concentrate the essence of our knowledge of this business.

In general, E. R. P. I. handles the kind of things which you referred to as by-products, the things which are not di-

rectly a part of the operational functions of the Bell System [fol. 7700] as a communication company, such things as talking motion pictures and odds and ends of physical equipment which have a use both in and out of the communication business, and I think they handle also the relations with organizations in and out of the United States, on certain things in the communication field, such as submarine telegraph cables. That is not quite a by-product in the sense that I first defined it—it is in the communication field, but it relates to business which is not particularly of the United States.

E. R. P. I. handles also phonograph recording apparatus in so far as it relates to the use of that type of equipment outside the Bell System. I think Graybar handles public address systems. That is really communication apparatus, the kind which is used largely by the associated companies, but it has a use outside of the operation companies.

I don't know about the details of E. R. P. I.'s handling electrical phonographs for theaters or for broadcasting stations. E. R. P. I. also handles picture transmission apparatus at different times in so far as it is related to sound pictures. I think they handle nothing connected with straight motion pictures.

E. R. P. I. also handles cathode ray oscillographs, which is a measuring tool, and it has some utility wherever it is desirable to examine the character of alternating current circuits, college and university laboratories and other electrical laboratories. It may be handled, however, by Graybar, but it is a by-product type of thing which may be handled by E. R. P. I.

Telephotography is used wholly within the Bell System and it is of relatively small use.

Television is not a practical thing. It is still very much in the development stage.

I do not think E. R. P. I. handles radio. I think that is done through Graybar. Graybar handles the vending of communication apparatus in a non-Bell field. For instance, telephone cable as used by railroads is handled through Graybar. Deaf set apparatus is handled through Graybar. The small amount of interest which we have in radio through broadcast transmitting sets we have handled through Graybar, and I think the public address sales are through Graybar.

[fol. 7701] I know of no by-products, things which have

come out of our general work in the broad field of communication but which are not of a communication nature, which are handled through Graybar.

The Department of Development & Research has been interested in the development of vacuum tubes and their applications, in the sense that vacuum tubes are a very powerful and valuable tool in the communication business, but as I have indicated before, the Department of Development & Research, having no laboratories, its interest in the development of vacuum tubes and the things in which vacuum tubes can be used is not in a position, nor does it do physical work looking to the development of those things. But many of these by-products which we have been referring to, do involve vacuum tubes, and in the sense that the Department of Development & Research has had an interest in the proper development of vacuum tubes, to that extent you might say they are involved in the by-products.

The vacuum tube because it is inherently based on physical principles which make possible enormous amplification without distortion, is at the heart of all amplifying devices, and distortionless amplifying devices have made possible loud speaking telephones such as are used in public address systems, and more recently in talking motion pictures.

Talking motion pictures, as a matter of fact, in the sense that we now know them, were an impossibility until a satisfactory loud speaking telephone came into the picture. Most people I think have an idea that the problem was a problem of synchronization of sight and sound. Actually the problem was primarily a problem of the loud speaking telephone to get a sound which was comparable with the sight which one got through one's eyes. In the very early days of experimentation, years and years ago, on so-called talking motion pictures, you might have a life-sized picture but a miniature voice, so that it would fail to give the sense of reality which is required for successful talking motion pictures. Now, the success, whatever success there is in the present talking motion pictures, in the last analysis, goes back to the character of the amplifying device and the loud speaking telephone and also to the character of the record [fol. 7702] which starts the energy through the train.

The idea of the telephone repeater as a useful tool in the telephone art is almost as old as the telephone itself. It involved the idea of revivifying weakened current from a

local source of energy and doing it without distorting the thing which you amplified. Until the vacuum tube appeared in the field of our scientific knowledge as a distortionless instrument, all of the attempts to make telephone repeaters were confronted with the difficulty of this distortion characteristic. All of the early attempts, and they were in some cases fairly successful, because of the extreme ingenuity of the men who worked on them, involved essentially the principle of an ordinary telephone receiver actuating what was, in effect, an ordinary telephone transmitter, which was supplied by local energy, but the best of those instruments all introduced a considerable amount of distortion, so that while you could amplify the energy on the far side of the telephone repeater, the character of the current, of this amplified current, was not a mirrored image of the thing which was put in at the initiating side.

When the present thing which we call the vacuum tubes came in the pictures, as a result of scientific research the picture changed, because there was given into our hands the embryo of a device, which could produce as much energy as we wished to employ without substantially affecting the character of the currents which we put in to control it and consequently it became possible to begin real constructive work on the development of telephone repeaters, which would do one of two things. Either they would very greatly extend the range of circuits of an existing character by revivifying energy as it became too small to be usefully employed or, conversely, they provided us with the means of reaching between two more or less distant points with smaller and cheaper types of physical connecting circuits. Now, that same characteristic which was so valuable in the telephone repeater art and which has made possible such a wide extension of local and long distance telephony is identically the principle which is required in much of what is known as radio transmission, both at the transmitting station and at the receiving station. At the transmitting station this ability to amplify without distortion, and another characteristic which the vacuum tube has of permitting you [fol. 7703] to mix things together, to modulate one kind of current by another kind of current, finds its use in taking very weak currents and raising them to the enormous powers which are required at the sending station; at the receiving station, as we all know from the radio sets we have in our houses which enables us to take infinitesimal small

amounts of energy and control considerable sources of local energy whether from batteries or electric light circuits and produce through the loud speaking telephone a sound which can be heard by one or many people and which is substantially the same sound which was spoken into the transmitter at the distant transmitting station.

Telephone and long distance lines are used in broadcasting in two general ways—they are used in what are known as pick-up circuits, namely, the circuits which connect the place of origin of the thing to be broadcast with the transmitting station—a banquet in some hotel is to be broadcast, the sound of the speaker's voice is picked up by a special high quality microphone and, if necessary, is amplified to whatever level you want at that point, and is then transmitted over telephone wires to the central studio of the broadcast station, where it is amplified—if it is a broadcast station, it is amplified to the desired degree and put out into space through the antenna. Every pick-up which is distant from the broadcasting studio itself is conducted over wires of the telephone plant.

The telephone plant is used also to connect the studio if it is remote from the transmitting antenna itself, with the transmitting plant. Then in addition to that, modern broadcasting, which we all know, involves frequently chains of stations, broadcasting stations on the same or different wave lengths scattered over the length and breadth of the land and telephone circuits are used to connect all of the transmitting stations into a common distributing point.

The Western Electric manufactures equipment used in connection with radio which is used in the Bell System for transmitting or receiving telephonic speech by radio. It also manufactures and sells the transmitting equipment for broadcasting stations. One other thing, it manufactures and sells to the United States Government and to the other departments of political government, radio equipment. It [fol. 7704] does not manufacture radio broadcast receiving sets for the home.

So far as the Bell System is concerned, the Western Electric sells direct just as it does any other kind of equipment. Broadcasting transmitting equipment is sold through Graybar.

The sale of this type of equipment—communication equip-

ment through Graybar, is the natural outgrowth inherent in the history of the Graybar Company itself, the Graybar Company having been originally the non-associate part of the Western Electric. Originally these things, before Graybar was formed, were sold by the non-associate part of the Western Electric Company.

Western Electric sells none abroad and I do not think it manufactures for sale abroad. It is barely possible that the International Standards Company may occasionally order something from the Western Electric, but the Western does not sell abroad in the sense of dealing with the ultimate consumer. Certain of the equipment which has been used at the distant terminals of telephone circuits, which radiate from the Bell System in the United States, has been manufactured by the Western Electric.

New apparatus or improvements in apparatus or inventions or processes contributed by Development & Research since the beginning of 1923 include many of the things that have gone into the more recent developments of new central office equipment or the bettering of the older art.

The same applies to sub-station equipment, for example, such things as the hand set which has come into quite common use in that period. The development of all forms of repeaters for both voice frequency circuits and carrier current telephone and telegraph circuits. Equipment in the field of telegraphy, particularly in connection with the machines, the printing machines which are used on telegraph circuits, the switchboards which are involved in the newer forms of the switching telegraph circuits. Types of telephone cable, either to provide larger numbers of circuits within a given sheath diameter or circuits of a special character; devices to ameliorate the objectionable effects of interference of one sort or another; radio equipment in so far as it is designed to improve the possibilities of utilizing [fol. 7705] radio, such things as electrical filter devices which were needed to give improved transmission through apparatus or other circuits. There are probably a lot of other things that I do not happen to remember.

The two groups, the Department of Development & Research, A. T. & T. report to me as the vice-president of the A. T. & T. The Bell Telephone Laboratories report to me as its president. They are essentially part and parcel of a single organization in which there are no overlapping functions but co-ordinated functions. Primarily, the work

of Development & Research is to formulate the problem which has to be solved physically in so far as it relates to the business of the Bell System. In doing that it studies every condition that it can find which has a bearing on the formulation of those requirements. If the problem is one that arises out of the developing needs of the associated companies, it seeks its basic information very largely in the requirements which give rise to that need. It may be that the problem—it may be a specific case arises from a stated need in some one associate company. Two things are done either directly by the Department of Development & Research or indirectly through the Department of Operation and Engineering, first the specific need at the point of origin is studied, and second, the whole field of the Bell System is surveyed to determine whether similar needs, possibly not identical, exist throughout the system, all with a view to having whatever is done as generally applicable as possible. In addition to determining through its own knowledge, the knowledge of its people and through contact with other departments of A. T. & T., its preliminary consultation with the laboratory people and, if need be, with the Western Electric, to the extent that contact is through the laboratories, attempts to find out by their studying the requirements whether there are physical limitations to the probable accomplishment of its desires. Having formulated finally the problem to be solved and having satisfied itself that the problem is one which can be solved and which should be solved, it then states the requirements for physical things to the laboratories in what you might call a form of a specification. The laboratories then takes it—it becomes the sailing directions for the laboratories' organization which has the physical plant, to carry on the experi- [fol. 7706] ments, and they proceed from that point to develop the physical things which meet the requirements of the user and in carrying out their part of the job, the laboratories make use of all the machinery which is at their disposal including their ability to contact with the Department of Development & Research and their ability to contact with the Western Electric which, if it is a physical thing, will ultimately have to be manufactured by them, to the end that when they get through with their part of the job, the answer will meet two conditions, first it will meet the condition of service as outlined through the Department of

Development & Research and, second, that it will meet the condition of being susceptible of manufacture.

The expenses of operating in the Bell Telephone Laboratories, Inc., are charged in general to cases which are taken out to cover specific things which are undertaken. The expenses of operating the laboratories are paid by its three customers; they are the A. T. & T., Western Electric or E. R. P. I.

By specific authorization generally in advance of the undertaking of the work from the party to whom the ultimate bill is to be rendered, it is determined which of the three should pay. The laboratory is run at no profit and at no loss. The expense which is incurred by the laboratories is made up of these parts: The actual salaries or wages of the employes, the cost of material which is used or equipment which is purchased and which is specifically allocable to definite cases is charged to those cases. The general expenses of administration and the corporate expenses are covered by loadings which are applied to the direct expenses which are allocable to the work which is done, so that at the end of the year the total out of pocket expense of the laboratories from every cause is covered through the billings to one or the other of those three people.

There are really three kinds of loadings which appear in the making of the cost. One is a departmental loading which takes care of the salaries and expenses of administration within the division of the laboratory itself which cannot be very well allocated specifically to jobs. Then there is the commercial loading which is the cost of general administration within the laboratories, the charge for the cost of [fol. 7707] the plant which is employed, stenographic services, heat, light, water and what not that are common facilities that are provided to everybody and finally there are the corporate—what you might call the corporate loadings, taxes, etc., those general expenses which are a part of the whole thing. Those things are apportioned to the different departments and through the departmental loadings become loadings on the individual kinds of work as far as possible, in proportion to the values or to the benefits of each kind of work in participation in the whole.

What I had in mind when I made that statement was this: In the Bell Telephone Laboratories we have a group which is essentially a manufacturing group. All the vacuum tubes which are used in any part of the Bell System organiza-

tion are manufactured in the laboratories. That is because being very new and as yet a somewhat unknown kind of thing, that type of manufacture has to be carried on very closely in contact with the research people, but in figuring the cost of jobs in what we call our tube shop, the loadings there are not the loadings of the group which is working as research people on vacuum tubes. It is a lower—when the plant is running at full capacity it is a lower loading in so far as general administration is concerned. In times like this, when that particular manufacturing operation is at a relatively low ebb, this departmental loading, which results from a large amount of equipment which is devoted wholly and solely to that, may be somewhat high, higher than it was a couple of years ago, but that function is performed as nearly as we can in an organization like ours as though it were a manufacturing rather than a research and development organization.

Any vacuum tubes that are used in connection with the business of E. R. P. I. are manufactured in this same tube shop. All of the tubes which are employed by any part or portion of our business are manufactured in that place and that place only. The vacuum tubes which may be used by E. R. P. I. are manufactured on order from Western Electric.

The loadings are apportioned, as best we can, over the activities of the laboratories for the character of the work which they do. In so far as there is variation—as there may be variations in the loadings of this department as [fol. 7708] compared with that department, then that portion will be reflected in the billings to the customer. Take an extreme and absurd example of two departments where for some reason the loadings are somewhat different, and assuming that all of the work of one department is for one customer and all the work of the other department is for another customer, then the loadings would be different as between the customers, but if the work is distributed roughly over the entire group, then each customer gets its share of the loadings in proportion to the amount of work which it has done.

Bell Telephone Laboratories, Inc., have a Patent Department which procures patents for Bell Telephone Laboratories and for other organizations in so far as by matter of request of the Patent Department, A. T. & T. or Western Electric, by patent searches or preparation for inter-

ference cases, or things of that kind. In general, however, it is maintained wholly and solely as an integral part of Bell Telephone Laboratories organization to do these things: To secure patent protection for the new things which arise out of our research and development work, to make the necessary searches to enable us to advise the A. T. & T. and Western or E. R. P. I. that the thing which has been specified for use is free of probable patent infringement. It is operated just as any other department of the Bell Laboratories is operated as an integral part of the machinery of research and development.

If in the inception of the idea there is invention of a patentable character, the patent goes to the man in the Development & Research Department who conceived the idea. If, however, the inception of this thing, which is ultimately going to result in a patent, is a broad inception, of a kind such as I may make, but the invention occurs through the process of carrying out that idea, then the patent goes to whoever it was that made that patentable invention. In other words, we do what the law requires us to do, we try to find who was the inventor of the thing which is patentable.

When the inventor is one in the Department of Development & Research, A. T. & T. in general it is handled in the Patent Department, A. T. & T. It may be handled on request of Mr. Folk's department by the Patent Department of the Laboratories if they are in a better position to go [fol. 7709] through the machinery, for example.

The Patent Department of the Laboratories is by far the largest patent group which we have in the Bell System and in some branches of our activities notably in the central office, the switching type of thing, they are far better equipped to handle the matter of preparing specifications and carrying the patents through the Patent Office than is the Department, we will say, in the A. T. & T. It may be that in some cases of an invention made in the Department of Development & Research relating to that field, to actual mechanical work, the legal work which is required to carry that through the Patent Office is turned over to the Patent Department of the Laboratories. Conversely, if an invention is made by some one in the laboratories in a field where Mr. Folk's department is better equipped to handle it, the matter is turned over to Mr. Folk's people.

In the case of work that is done in the A. T. & T. Patent

Department no billing is made to anybody. In the case of Laboratories Patent Department, since all of our expenses have to be billed somewhere, the actual cost of taking out patents as distinguished from the work which the Patent Department does in consultation with people during the progress of work, the actual cost of patents, taking out patents follows the patent. Ultimately the patents are assigned out of the Bell Laboratories. The Laboratories is not a patent holding or a patent operating organization. A patent taken out on work which is done in the Laboratories is merely a part of the work of development and research and ultimately assigned to either the A. T. & T. or Western Electric and as I remember it, the cost of the actual patent taken out follows the patent. It is paid for by Western Electric if the patent goes to Western Electric. It is paid for by the A. T. & T. if the patent goes to the A. T. & T.

Conceivably a problem may come to the Bell Laboratories from Western Electric which developed material of patentable novelty during the course of its solution, but the patent may be in the field of patents which are owned by the A. T. & T. because, by long existing contract, certain kinds of things are Western Electric and certain kinds of things are A. T. & T. In that particular kind of thing the patent would ultimately reside in the American Company and the [fol. 7710] American Company would pay the cost of taking out the patent.

All of our requests are made by Western Electric, by A. T. & T. and by E. R. P. I. We may know and probably do know in specific cases what the genesis of that thing was but they are not put to us in that form, but rather as a problem for the Graybar Company, this is a problem for Western Electric. We have no relations with the Graybar Company in the same sense that we have relations with the other three.

Some of the materials used in the Bell Laboratories are purchased from Western Electric.

In the case of apparatus of Western Electric manufacture, we pay the associate price, the same price that any other part of the Bell System would pay for that material. In the case of raw materials which we buy through the Western Electric Company, we pay the same price that any other part of the Bell System would under whatever contracts the Western Electric Company has for purchasing that sort of thing. In other words, we may make

use, just as any other part of the Bell System does, of the Western Electric Company's general purchasing contracts wherever we can. Of course, there is a considerable amount of stuff, incidental stuff, which we buy directly from outsiders.

Frequently we have work that runs over a great many years before it results in anything commercial or anything that is used. Take a very simple, specific example. A good many years ago, telephone cables, the ordinary lead-covered cable which is so familiar to all of us, had the wires in it insulated with wrappings of paper, made out of old rope. The purpose of that insulating material was to keep the wire apart and a fundamental requirement for the best cable was to have as little mechanical material as possible between the wires and to have it of a character which would produce less energy losses in the cable. The best material that we knew of for that purpose was essentially cellulose, wood or vegetable fibre, and such as used in making paper, and the way in which we applied it, because we had to apply large quantities of it at a very low cost, was to have these fibres made into paper and cut into ribbon and the ribbon wound on the wires in a crumbled form. Because of the mechanical stresses applied to the ribbon in the process of winding it on the wires, the paper had to be extremely strong. This resulted [fol. 7711] in limiting the source of paper to paper made out of long fibre material and so inherently expensive. At various times suggestions were made and trials undertaken to use shorter fibred material such as wood pulp, which was as good from an electrical standpoint. All of these failed, however, because of the lack of mechanical strength. A considerable number of years ago someone suggested that since all that was required in the final product was a proper amount of properly distributed fibre around the wires, there was no necessity for going through all of the elaborate operations of paper making, that the paper might be formed directly on the wires, thus eliminating all of the actual processes in paper making, slitting and winding, and producing an end result identical with that theretofore obtained. This idea was so promising that work was undertaken for its practical development. Because of the many difficulties which we found to reside in forming a uniform layer of paper directly from pulp on the wires, this work extended over a large number of

years and has only recently come into the realm of practical application. It extended, I should say, not less than 10, in that order of magnitude. That is not an unusual example.

We have at the present time a considerable number of problems on which we have been working for many years and on which the work is not yet completed. Probably the most striking example of what you have in mind is found in the hand set which has come to be used commonly in the last two or three years. That problem, to my own knowledge, has been worked on assiduously for more than 20 years and has only recently come to a satisfactory solution, and the reason for it, for this long period of time, is found in the fundamentals on which the Bell System has built up its nation-wide plant because hand sets have been in common use in foreign countries for many years. Our difficulty in that particular case resided in the basic idea, which has been the fundamental of Bell System transmission development since long before my time, namely, that the transmitter and the receiver which are attached at the substation shall be each of the highest possible efficiency and of the highest degree of uniformity. Now, when you have a very highly efficient transmitter and a very highly efficient receiver and supply energy to the combination of the two as you do through a central or local battery, you have an [fol. 7712] arrangement which has a very great tendency to vibrate in its own natural period. If the transmitter and the receiver are brought into juxtaposition anyone who has tried the experiment with the ordinary desk set on a station which is not far distant from the central office, of putting the receiver in front of the transmitter knows what happens, the combination starts to howl and the higher the efficiency of the transmitter and the receiver the greater is the tendency to howl. In European systems where hand sets have been used for a long period of time, the difficulty, this howling difficulty, is obviated by making the transmitters and the receivers inefficient, but in our case, because we have built up a vast system on the desk set basis with the highest possible transmitter efficiency and the highest possible receiver efficiency we were estopped from using that solution. We had to have a solution which gave us a transmitter and a receiver, at least as efficient each as the transmitter and receiver of the desk stand, otherwise the introduction of the hand set would

produce an immediate degradation of the service of everybody who uses the telephones, but when we came to try to put a transmitter and receiver together, with a rigid connection through the handle, which could transmit vibrations from one to the other and maintain them to at least the same efficiency of the desk stand instrument, we produced an instrument which had a very great tendency to howl. Further, since the hand set can be used in more positions than the desk set was usually used microphone transmitters of the type which were entirely satisfactory in the desk stand were found to have positional effects, so that if one were lying in bed, for instance, and attempted to use the hand set, he might have a very different efficiency out of his instrument, and it took us many years to solve that physical problem satisfactorily and produce an instrument in the convenient form of the hand set, which would have the efficiency of the instrument, of which there were millions in use, without introducing this deleterious effect of howling or the equally deleterious effect of position which affected both transmission and affected the signalling over the circuits. As far as I know, that is the most striking one of the cases.

The failures are relatively few because of the way in which the work is conducted. What seem to be good ideas [fol. 7713] when they are initiated but which have only the inherent elements of failure, in general are caught long before they reach anything like a final stage. Either they result then in an abandoned experiment in its initial stages, or what is more usually the case, if the original idea was good but the reasoning at the start, because of lack of information, was faulty, the course of the development which was originally thought to be along this line is modified to another line and the end result is maybe a little different from what was preconceived, so that our failures in the ordinary sense are very, very few and I have no figures of percentage.

Quite a good many years ago when we were attempting to extend the length of open wire circuits, particularly in large ga-ge wires through the mechanism of loading, the application of the Pupin loading coils to lines, the question of the insulators supporting line wires became a very important factor because the standard glass insulators as we then had them, through leakage and electrical loss in the insulator itself, produced a very deleterious effect on

the transmission, and we sought to find a new and better type of insulator.

In this country glass was the standard which had been used for decades for insulating electrical wires but abroad we knew that they were,—particularly in Europe, that they were using porcelain and we made quite a large number of studies on porcelain insulators and came to the conclusion that porcelain insulators would give us much better results than glass insulators.

We ran into one difficulty at the start due to the relatively high labor costs in this country, which precluded the machining of porcelain parts, insulator by insulator, as they did in Europe, consequently the insulators had to be made, if they were to be used, within a reasonable cost by machinery processes, but that seemed to be a thing which we could get over because the porcelain manufacturers were already manufacturing high quality porcelain insulators for high tension lines and we finally through our elaborate laboratory tests arrived at the conclusion that we could make a very material benefit through the use of porcelain and that we could get a porcelain insulator of the character we wanted at a price which we could afford to pay and we embarked on the process of equipping some lines, quite long lines, with those porcelain insulators. At the start they were extremely good, but we neglected, [fol. 7714] through lack of knowledge, to take account of the bugs, insects, and we found after the first summer that because porcelain insulators were opaque and not transparent or translucent they were particularly sought for nesting places for bugs and that there were more bugs nested under the petticoats of porcelain insulators than under the petticoats of the transparent glass insulators, with the result that at the end of the summer all of the advantages of porcelain insula-ors had disappeared in thin air and we were worse off than when we started, so we abandoned the use of porcelain insulators and started looking for something else.

The directors of the Laboratories are Mr. Bloom, the president of the Western Electric, Mr. Stoll, the operating vice-president of the Western Electric, and Mr. Hosford, the vice-president of the Western Electric, in charge of manufacture. Mr. Bancroft Gherardi, the vice-president in charge of operation and engineering of the A. T. & T., Mr. E. H. Colpitts, the assistant vice-president of the Re-

search and Development Department, Mr. H. P. Charlesworth, the vice-president of the Bell Laboratories, Inc., and myself, seven of us.

The reasons for the organization of the Bell Telephone Laboratories, Inc., in 1925 were two essentially. First, that the laboratory function, as it was then carried on in the Engineering Department of the Western Electric had grown to such proportions in size and in character of work that it had outgrown the confines of a department of a subsidiary of the American Company and had attained to the stature of an associate company. That was one reason; and the other reason was, that as long as that very important function in the development and conduct of the Bell System remained a part of the Western Electric, a manufacturing organization, which was supplying material to operating companies, which were public utilities, the active direction within the organization of that function could not be vested in an officer of the American Company. I don't know what the law is, but under the general law, which was promulgated years ago with regard to railroads, it seemed very desirable that because it was primarily responsible for the conduct of research and development work, that an officer of the American Company should be the active director of the Laboratories.

Prior to that time, my predecessor, General Carty, as the head of the department Development and Research, while [fol. 7715] the titular head of the department, was not in actual control of the laboratory functions. So that reason, and the other reason brought about the formation on January 1, 1925, of the Laboratories as a direct subsidiary of the American Company in a form which permitted the vice-president of the A. T. & T., in charge of development and research to be, in his own proper person, the active executive of the Laboratories.

Without any change the personnel of the Bell Laboratories was on January 1, 1925, the same personnel that had been the Engineering Department of the Western Electric on December 31, 1924.

The Laboratories' researches in the physics of sound resulted in developments that produced the orthophonic phonograph.

It did result in the development of measuring devices, which were thought to have some possible application in the prospecting for oil, and I am not sure but what certain

small pieces of apparatus may have been turned over to organizations in the petroleum industry for their use.

At one time, it was proposed that we should undertake to do that sort of work by one of the large oil companies, because of the knowledge which we had in the field, which they thought would be of advantage in this prospecting business. But on a scrutiny by us, it appeared that that field was one so far removed from the normal field of our activities that it was not a proper field for us to embark on, and we never did embark on it.

Out of the work of any group—a large, organized group, such as is this laboratory, many applications outside of the specific field in which they are primarily interested, would be conceived.

Vacuum tubes as manufactured by the tube shop, operated by the Laboratories and for the account of the Western Electric, are used outside of the Bell System in such things as the services of the Army and Navy of the Government, where they involve communication,—radio or wire communication; they are used in the amplifying parts of Public Address systems, which may be sold to hotels or auditoria, playing fields or what not, wherever Public Address systems are used and they are used in the electrical [fol. 7716] parts, particularly the amplifiers of talking motion picture equipment, as it is manufactured by the Western Electric and transferred to the E. R. P. I.

The work on vacuum tubes began in the latter part of 1912 and has continued uninterruptedly since, in ever increasing amount, as is usually the case with any new and very useful tool, and the end is not yet anywhere nearly in sight.

The Development and Research Department of the A. T. & T. themselves did no physical development work, but they did a vast amount of study leading to the requirements for new and improved vacuum tubes, and in the testing of the final product and in the development of the applications of their use; but having no laboratories, they had never carried on work in vacuum tubes, in anything like the sense that people in laboratories do.

(Recess.)

(For deposition of George E. Folk, see Abst., Vol. IV, 1211-1230.)

JOHN G. ROBERTS, for defendants:

Direct examination.

By Mr. Haight:

I reside at Dobbs Ferry, New York; I am patent attorney, Bell Telephone Laboratories, Inc., and have been since January 1, 1925, the date of its organization. Prior to that I was assistant general patent attorney of Western Electric, from 1909 to end of 1924.

My department handles the patent matters for the Laboratories. After the patents are secured some are transferred to Western Electric and some to the A. T. & T. and others have not yet been assigned where the studies have not yet been completed as to which company it should be assigned to.

None go to E. R. P. I. Patents whose inventions are embodied in products sold by E. R. P. I. are assigned to Western Electric in some cases and in others they go to the A. T. & T.

As to those not assigned at all, we have not examined any of the patents issued during the current year for the pur- [fol. 7717] pose of determining their disposition. As to those issued prior to this year, we classify some of them as telephones and some as telephonic appliances and in accordance with the definition in the 1882 agreement between Western Electric and the A. T. & T. Those classifiable as telephones have been assigned to the A. T. & T. and the others to Western Electric. The remainder group have not yet been analyzed sufficiently to determine their classification, but they are assigned under the principles I have stated, regardless of who may be the inventors.

Occasionally I handle patent matters relating to inventions made in Development & Research Department, A. T. & T., and later worked upon by the Laboratories, and that comes about by specific request of the A. T. & T.

When an improvement invention has been made in the Laboratories, that is handled by my department. Then the question of to whom the patent is to be assigned is disposed of, as I have stated.

Patents on vacuum tubes generally go to the A. T. & T. I do not know of any subject matters upon which employes of the A. T. & T. have made inventions where the patents have been assigned to Western Electric. It is my under-

standing, for instance, that if an invention related to switchboard is made, the title to the patent would remain in the A. T. & T.

If the inventions are made by employes of the Bell Laboratories they are taken out and assigned to the Bell Laboratories at the time the applications are filed. Later on they would be disposed of in the manner that I have before stated.

We make recommendations with respect to foreign filings in most instances and our recommendations are generally followed by E. R. P. I. which files, in some cases, in foreign countries. There are certain other foreign patents taken out by the International Telephone & Telegraph Company pursuant to certain agreements made with that company and there are certain patents taken out by Northern Electric Company in Canada. Certain foreign patents are taken out in the name of Western Electric on our recommendations. I am thinking of some in South America and some in Canada and Newfoundland.

Assuming for example, that an invention is made by an [fol. 7718] employe of the A. T. & T. and then in the Bell Laboratories improvements are made upon that, as in the field of the movietone, and patents are secured through my department, those improvements patents are disposed of in accordance with 1882 agreement or remain in the Laboratories for future consideration. They may go, as I have above mentioned, to Western Electric or the A. T. & T.

FRANK W. JEWETT, recalled:

Direct examination.

By Mr. Haight:

Dr. Craft, in the Bell Laboratories Record, Vol. 1, at page 96, says:

"In the conduct of this work it has always been the aim to study broadly the problems of communication, paying attention not only to the electrical problems of telephony but particularly to the physical problems of what speech is and the mechanism by which we hear speech or music. In the last 12 to 15 years the results of our investigations have pyramided and now we have a fund of scientific knowledge and a technique which is largely responsible for our present

day telephony over wires and much that is fundamental to the present radio broadcasting art."

This publication appears to be in November, 1925.

I have no quarrel with the statement in that paragraph. I see that the paragraph is one of an article of some three or four pages, five pages, headed "Sound Recording and Reproducing." I have not read the remainder of the article so that I am simply taking the statement as it appears in that paragraph out of its context. But so far as that paragraph is concerned, I have no quarrel with the statement that is made.

In that same volume I of the Bell Laboratories Record, page 195, I notice the analysis of each dollar expended in what appears to be the 1928 program. I have examined the chart. This indicates that 71 per cent of every dollar which appears in the Bell Laboratories accounts goes to salaries. I should say that that was a reasonably fair thing. Actually [fol. 7719] in my own thinking I have carried in mind a higher figure for salaries,—roughly, of the order of 75 per cent of our entire expense, in the salary classification.

In Volume 2, which is bound in the same cover, page 67, there is an article that appears to be by Amos F. Dixon. I have read that which is part of the paragraph of an article entitled "Development of Communication Systems" and as a statement for that article I have no question on that, that is, systems of communication, and I think that is correct. That is to say, the requirements for systems originate in the Department of Development and Research or come to the Laboratories through the Department of Development and Research Department of the American Telephone & Tele- not read the rest of the article. The part to which I have referred reads as follows:

"The requirements which each development must meet are obtained by the laboratories from the Development and Research. That is only a part of the paragraph and I have graph Company, and in final analysis arise from the field and operating requirements, both present and future of the Long Lines Department and the associated companies. To these requirements, the Systems Development Department adds its views and past experience."

Volume 2, page 200, is an article by Joseph P. Maxfield. The first paragraph of that article refers to a contract. I know that a contract was entered into between the Wes

ern Electric and Vitaphone but I am not familiar with the terms of that contract.

The interest of the laboratories in this work—that is, the making and reproducing of moving pictures with accompanying synchronous sound records that is referred to—is an outgrowth of the development theretofore made of electrical processes of recording, the fundamental novelties of which were logical applications of the theories and the technique incidental to Bell System problems of transmission of speech and music.

In referring to phonograph records, there have been, as I recollect it at the moment, without having refreshed my mind in detail, three principal values to the telephone art of this work: One in the accumulation of knowledge with regard to what can be done in the way of making perma- [fol. 7720] nent records of telephone speech over regular telephone circuits looking to the possibility of sub-station recording devices which the subscriber might use in keeping a record of his own and his correspondent's conversations.

In the second place, we have had a very great interest in the development of very accurate and very fine phonographic records as a tool in the study of telephone equipment, telephone apparatus and telephone circuits.

To explain that particular interest it is necessary to realize that what we are dealing with in the telephone business in the last analysis is the production of electrical impulses which are mirrored images of the spoken word, evidence of those electrical impulses or re-transmission into sound impulses and finally their transmission into the ear of the distant party, and the one thing that we are dealing with is the fidelity with which the spoken word at one end of a telephone line is conveyed to the recipient at the distant end of the line.

Every instrumentality that is involved, from the first instrument opposite the speaker's lips to the last instrument before the orifice of his ear has an effect in affecting to some degree the characteristics of the vibrations as they issue from the speaker's mouth, and it is of the utmost importance to us to be able to determine how far each and every part and all of the parts act to modify the spoken word, because beyond a certain point, no matter how much en-

ergy you may supply to the receiver, if it was not in the form of intelligible speech the telephone conversation would be useless.

Now, for many years, since we are dealing in the last analysis with speech and hearing as they are evidences of human characteristics, the ability to transmit and reproduce has had to be measured against a human standard. For many years the only means that we had of measuring the goodness or badness, the ultimate goodness or badness of a particular piece of apparatus, a particular system, a particular combination was from the process of making actual speech and hearing tests, but human beings differ among themselves with regard to the goodness or badness of their speech and hearing, and each individual varies from time to time, depending upon his condition, so that those tests were difficult to make to the desired degree of uniformity which is essential for a final development, and the only way in which we could progress by that process was [fol. 7721] by the,—what you might call the statistical method, by the making of enormous numbers of tests, involving the same individual in many repeated tests and many individuals in many repeated tests and from a statistical analysis, getting an impression. To whatever extent we can insure that the impulses given to the initial apparatus, the transmitter, are accurate and duplicable we have improved the value of our tools, and as a phonograph record, in so far as it is indestructible, is a permanent record, which can be used over and over again with a knowledge that the initial impulses are identically the same. It is of value.

To that extent it is of very great importance to us as a tool in the development of the telephone art, so that we have had a very great interest in phonograph records from that standpoint.

There is a third use which has developed and which is of extreme importance in the telephone art of the present day and in which all of our work on phonographic reproduction whether by means of the ordinary disc type of record or the film type of record has been of very great value in the telephone business, and that is this: It has to do with the operation of the dial system of telephones, the common dial system in the day-by-day giving of service to the public.

When we injected first the dial system into the telephone business we injected a mechanical means of passing orders

into a system which had been developed to very large proportions around the passing of orders by word of mouth from the subscriber to a human being, the operator, who carried out those orders. We introduced in the dial system a means by which the subscriber's orders were passed by an operation of his finger instead of his lips and since we could not change the system, the entire system of the United States over night from a manual system to a dial system, but had to make the introduction in gradual steps, we had to have a scheme of operation which was usable in connections from dial telephone to dial telephone, from dial telephone to manual telephone, from manual telephone to manual telephone and from manual telephone to dial telephone.

In so far as it is possible to do it the operation of a subscriber at a given station, in getting the desired number, [fol. 7722] must be the same, irrespective of what kind of station that distant station is. The subscriber has no knowledge other than the number which he finds in the telephone directory. He cannot be supposed to know the intricacies of the mechanisms by which his orders are carried forward. In other words, his operation must be the same irrespective of what kind of telephone his correspondent may have or what kind of a central office he may be connected to.

In the case of the manual telephone, which he had been accustomed to using, he passes his orders by word of mouth, he knew nothing further than that he gave those orders to some human being, and in a great majority of cases, except where errors, either of his own making or somebody else's making interposed, he got the distant desired number or he received a busy signal or a don't answer signal and that had to be the case after the dial was introduced. If he was one of those who had a dial telephone he dialed the number, he said nothing until he got the distant party after he dialed the number and in due course he got the distant party. If his call was over a dial telephone connected to his own exchange or to another dial exchange in the same city the whole thing went through as a mechanical operation. If, however, the party that he desired to reach had a manual telephone, then at some stage of the game a human being, a human switch had to appear in the picture and this mechanically dialed order had to be given to that human being.

In the early systems, the very earliest introductions of the dial system that ordering was done by what was known as a

carriage call. The dialing of the number by the originating subscriber set up in front of an operator at the distant station the number of the desired party. The operator received, through a lamp signal, an indication that a call was coming in on a particular trunk and then in front of her appeared a series of numbers, for example, 1, 2, 3, 4, which indicated that the call on that particular trunk was destined for station 1, 2, 3, 4. She got that number through her eyes and she plugged the end of the trunk into the desired subscriber's line.

In large offices, very large offices, it may be possible to segregate the operators into two groups, one group to handle incoming calls from manual offices in which they received the numbers in the ordinary way from the distant [fol. 7723] operator by word of mouth, through their ears, and another group who receive orders only from dial originating stations, and all of their orders came in the form of these call indicating affairs, but it is not always possible to segregate operators in that way, particularly in the smaller or outlying offices where only a small fraction of the calls originate at dial offices and in consequence the operators at those places have to perform their functions of making this last connection under the guidance of orders which came in in two different ways; one set of orders came in through their ears and another set of orders came in through their eyes. That is, the first are those which originate at manual stations and the others came in through orders which originated at dial stations. In other words, it put a double burden on the operators and an obstacle in the carrying on of efficient and rapid telephone switching, so it became apparent at a very early stage that if we had some way of translating those finger dial impulses into the spoken word at the distant station, then the operator at the distant station need know no more about the origin of the call than the subscriber himself knew about the character of his correspondent's telephone, and in the modern machine switching central office areas there has been developed and is being used with increasing amount of phonographic type of apparatus by which, at the distant station, the dialed impulses which are designed to connect the line to a manual subscriber are translated, through a phonographic apparatus into the spoken word; the number arrives in the form of a set of impulses which, in the older system, would have set

up the number 1, 2, 3, 4, but actually what happens is that they are passed to the operator in the form of the spoken word, 1, 2, 3, 4. Except as she may be able to distinguish between phonograph 1, 2, 3, 4 and a spoken 1, 2, 3, 4, she has no different kind of orders whether the call originated at a manual office or whether it originated at a dial office, and she consequently performs her functions with one simple guiding rule to tell her what to do. She does not have to use her eyes in the completion of any of the calls except in so far as she has to see which jack to plug the plug into, but she gets her orders through her ears in all cases. In some cases they come to her through a word spoken into a microphone which goes directly into a telephone receiver. [fol. 7724] In others, they come to her through the impulses which start by the subscriber's finger but end up in her ears in spoken words.

Now, the extent to which, and the ability which we have of making that final spoken word as nearly as possible like the human spoken word, the more efficient is the system, so that we have had a very great interest in phonographic reproduction in any form for that purpose. Those are three very important ways in which we have been interested in phonographic reproduction and very accurate phonographic reproduction.

The knowledge required in that development has been useful in the phonographic art disassociated from telephony, and, conversely, the information which we have gained in our work on the phonographic art has been of inestimable value to us in the carrying out of our development of those lines, as I have described. Our Research and Development in respect to phonographic records has been practically applied to phonographic instruments, outside of telephony.

Our initial work in the phonographic art per se came as a direct result of our work in the telephone field. Our subsequent work in the telephone field has been largely influenced by the work which we have done in the phonograph art.

In the present stage of scientific and engineering knowledge, the only known way of producing what is known as a television image is to make use of the property of the human eye, the retentive property of the human eye which makes motion pictures a possibility. This property, which

results in the impression of continuity of motion being sensed by the brain, if the succeeding images are sufficiently close together but of moderate duration which is that 1/16 of a second that we hear so much talk about.

Making use of that property, all developments of television in the present state of our knowledge are in fact technical modifications of a single process, which is to view the object to be transmitted a very large number of times in successive small increments which viewing is in an orderly fashion across the whole image and to view the image with this multiplicity of scannings, at least 16 times a second, and transmit the electrical impulses which result from that process to the distant points and there reassemble them. It is, [fol. 7725] in effect, to take a plane surface and string it out into a line, making use of the fact that you have a 16th of a second to do this kind of a thing in, and then at the distant end of the line re-transpose one-dimensional space into two-dimensional spaces. That process, by whatever means of scanning or by whatever means you reproduce, in so far as the electrical impulses are concerned, result in what are in effect currents of very high frequency, and whenever you have currents of very high frequency you thereby have a wide band of frequencies that you have to deal with in your transmission system, whether it be by wires or whether it be by radio, so that there is a limitation in the transmission of television images which inheres in conjunction with the band.

The bands are very, very much wider over a circuit, whether it be wire or whether it be radio, over a channel which is capable of transmitting high frequency current and which is capable of transmitting a television image, over that same circuit you could transmit many telephone messages and very much larger numbers of telegraph messages and as the goodness of the television image goes up toward perfection, the width of the band increases, consequently the number of possible telephone messages or telegraph messages increases. Of course, it is not possible in the present state of the art to produce or to reproduce,—leaving out the transmission part of it,—television images of the goodness of motion pictures, that is, quite irrespective of the transmitting channel; but if it were possible to produce at the sending end the electrical currents corresponding to the perfect scanning, and at the transmitting end to repro-

duce those in a perfect image, the width of the band would be a wide band.

Television is a transmission of intelligence of a kind, just as telephony is a transmission of intelligence of a kind or telegraphy is a transmission of intelligence of a kind. They are not the same kind of transmission, nor is the intelligence which they transmit identically the same in the two cases. In that sense, they are different arts.

In the sense that they involve the same kinds of apparatus, the same kinds of the circuits, the same laws governing the transmission of currents, they are part and parcel of the same art and there is no sharp line of demarcation between the things and from the standpoint of the development of the telephone art, viewed narrowly as the transmis- [fol. 7726] sion of speech between human beings, knowledge gained in the development of the circuit requirements for television plays a very important part, for the reason that anything that we learn with regard to the characteristics of circuits which will transmit this wide band of frequencies is immediately applicable in the art of telephony because it automatically gives us the possibility of obtaining over a single channel a multiplicity of telephone channels of the narrower art.

They are certainly different, but how different is a pure speculation which resides in one's judgment of how far the television art may go toward the production of perfection and how widely that can be distributed to people who may want to use it, but I will say this, that in so far as the economics are involved in the cost of the transmission channels, then you must say that the television art is a much more expensive art than the telephone art.

On account of their work in that field, the most outstanding one, who has devoted a considerable part of his time to the development of television and what is closely allied to it, the thing that we talked of yesterday, telephotography, is Dr. Ives. I suppose he is the most outstanding man in the world in that particular field. He is essentially a man,—even before he came to us,—who was skilled in the photographic art and he has devoted in recent years a very considerable part of his time to the development of telephotography and television.

His work on television goes back certainly five years and possibly six or seven, at the outside. The fundamentals on

which systems of television are based are very old,—40 years old. It is only within recent times that those ideas have had any possibility of practical application, through the advance of general science.

Improvements of things that are old and new both—the most outstanding one that occurs to me at the moment in which a very great advance has been made in the last ten years, that is, an advance which has influenced all of the longer distance telephony,—I would say all telephony over a very few miles in length,—has had to do with improvements of the loading coils which are an integral part of every circuit of more than the very shortest lengths, and that improvement has grown primarily out of our fundamental work to develop new magnetic material.

[fol. 7727] Originally loading coils were made which were magnetic affairs, coils of wire wound around a magnetic core—were made on magnetic cores which were composed of the fine iron wire. They were large and they were expensive and they took up a large amount of space in the manholes or on the poles on which they were installed and they had certain disadvantages. In our endeavor to find a magnetic material which was better than iron wire, we were led first to the making of these cores out of powdered electrolytic iron, each particle of the powder being properly annealed and properly insulated and then pressed into a form under enormous hydraulic pressure. That resulted in improvement in quality, reduction in size, and reduction in cost. Then in our further endeavor to get improved magnetic materials, we developed what were known as permalloys. They were alloys of magnetic materials which in the condition of magnetic fields as they are in the telephone and telegraph art, have very remarkable magnetic properties,—very many times more magnetic than the best iron and steels of the older art, and the iron dust loading coils which had been a great improvement over the iron wire coils have been superseded by cases in which the magnetic coils are permalloy or alloys of the permalloy type and they are very small coils, much less expensive than the older coils, occupy very much less space and in consequence are used in very great numbers. That work has progressed enormously in the last ten years. In fact, I think that the whole supersession of the earlier coils in new installation by permalloy has taken place in that period of time. There

have been very great improvements, of course, in the efficiency and economy of repeaters. There have been very great improvements in the development of electrical filtering devices, those devices which enable us to confine the frequencies that we are interested in, within defined limits and thus make possible not only better quality but make possible the putting of more circuits over single channels.

There have been very great improvements in the development through the use of vacuum tubes of electrical filters and our general knowledge of the way to combine these things in what is known as carrier systems of telephony and telegraphy by which you multiplex a number of channels of telephone or telegraph over a single channel.

There have been substantial improvements in cable [fol. 7728] during that time in two directions, one in the direction of making possible the use of smaller wires and so more circuits in a given area; and second in the arrangement of those wires in the cables. I spoke yesterday of the improvements with regard to insulating material.

There have been decided improvements in toll boards. That art, as I understand it, is, however, one in which the improvements were in the nature more of refinements on existing things and the provision of added facilities to enable more rapid and more economical operation.

Improvements in the local switchboards helped in the long distance service very little, I think, except in so far as the same apparatus is used in all kinds of switchboards; improvements in plugs, jacks, cords and relays is common to the entire switching business, so that whatever is done to improve individual pieces of apparatus primarily for one service, if it is a real improvement, finds its use in all other similar kinds of switching.

The carrier system means—all forms of telephony, even the common or garden variety of telephony is a carrier system in a way, that is, in the telephone transmitter you superimpose alternating pulsating current on a direct current, a current of zero frequency, if you will. To that extent it is a carrier system. In the things which are commonly referred to as carrier systems the current on which you impose the fluctuations of the spoken word is itself an alternating current of a constant frequency and what you do by the process of imposing those things is what we call modulating; we modulate the frequency and in the process of modu-

lating, which is what you always do when you mix two frequencies together, when you make one frequency affect another frequency, you initially end up with three things in the output side the residual of the carrier on which you have loaded this thing, and two things which we call side bands which are groups of frequencies above and below the carrier frequency, which have a width equal to the width of the frequency of the spoken word and which are merely the frequencies of the spoken word added to or subtracted from the carrier. What you do by the process of modulating these high frequency currents is, in effect, to raise the frequency,—you can use either of these side bands or both, but in general one, because there is no object in using [fol. 7729] both. In many cases it simply means a duplication of energy. What you do when you take one of these side bands, we will say the lower side band of a particular modulation is, in effect, to raise the frequency of the human voice from one level to another—the higher level, roughly the level of the carrier current. The frequency band which you get there, while it is as wide as the frequency band of the voice would be, is in most cases, unintelligible to the human ear and in many cases undistinguishable by the human ear, despite the fact that it has all the characteristics of the frequencies in the lower band and at the distant end of the line you do the reverse process, you take the carrier and reduce it to the lower level. Within the limits which are imposed by the width of the band of the human voice and the necessity to avoid interference, you cannot have those bands overlap in frequency without producing cross talk. You can theoretically put as many telephone channels over a given telephone circuit, over a given pair of wires as you can conduct high frequency currents over it. That is, if you took the entire theoretical,—if you took the entire range from zero frequency to x-million frequencies and if you can transmit those things non-interfering, you can have as many telephone channels as there are multiples of the width of band of ordinary speech on there. Theoretically, then, you can do an infinite amount of things over a given number of wires or any other kind of channel, radio or anything else over which you can conduct this frequency but practically you are limited by the elements of cost principally and complexity of apparatus and reliability of service of large magnitude because, in effect you are putting

all of your eggs in one basket when you use one pair of wires to take the place of many pairs of wires between two corresponding points. But even leaving aside the question of reliability, the question of economics begins to run very shortly after you reach a reasonable number, not too large, 4 or 5 or 6, maybe a few more, superimposed channels of telephony and maybe two or three times that number of telegraph channels because telegraph channels are a little bit narrower. That element comes into effect because at the transmitting end, if you are going to have many channels, and at the receiving end, if you are going to separate those channels, you must have a very complex apparatus, particularly complex in the form of these electrical filters, [fol. 7730] which allow only a particular group of frequencies to go through that filter and the question of complexity soon reaches the point where it is more economical to provide an additional channel than it is to provide the complex apparatus at the terminal ends, but theoretically you can transmit an enormous number of telephone and telegraph conversations over a given channel without interference.

"Given channel" means a pair of wires or grounded circuit,—if you are using a grounded circuit, as you do in the case of a submarine telegraph cable or a radio channel. Radio is not different from telephony or telegraphy, in the sense that telephony or telegraphy are different from each other. Radio is merely one of the many ways of conducting electrical impulses and those impulses may be used for a variety of purposes or radio as they are used for a variety of purposes by wire, such as the transmission of power, telegraphic communication and telephonic communication.

The switchboards, in so far as they facilitate the operations of setting up connections, have had to do with an increase in speed of service, because of the development of new methods of handling what are commonly known as toll service and the elimination of operators permitting one operator to do what formerly took two or three in the built-up connection.

The carrier method was made possible by the vacuum tube because of the properties—the remarkable properties which we were able to develop in vacuum tubes, once the principle of those vacuum tubes was disclosed; the principle of distortionless amplification and the property of utilizing that

device as a generator of high frequency currents and the modulator of high frequency currents.

An article appearing in "Bell System Technical Journal" of January 30, 1930, entitled "Telephone Communication System of the United States," by Mr. Gherardi and myself, is a general article which represented the communication system of the United States at the time it was written, in so far as it had been developed to give local and long distance service within the United States. The main body of it has to do with the regular national telephone service and at the end there are a few notes with regard to adjunct services where telephony is employed, such as telephony to mobile stations, ship-to-shore telephony, transmission of pictures, program transmission, and a few slight references [fol. 7731] to by-product things which have grown out of our development work covered in two or three paragraphs.

It was presented to the World Engineering Congress at Tokyo, Japan, in October, 1929. I have not read the article since it was presented, and whether my views have changed in two years since it was presented, in any detailed point, I would have to read over the article carefully to see. So far as the general things are concerned, as stated there, my views then expressed are substantially what they are now.

Mr. Haight: I would like to offer the whole article as an exhibit, subject to the right of the other side to examine the same in any way they may see fit.

Mr. Blackman: I object to it at this time, but as I say, in order to save time and avoid a multiplicity of questions, I would be glad to have Dr. Jewett read it and if he says now that he agrees with every line of it, then, of course, I will enter into a stipulation.

Mr. Haight: That is entirely satisfactory. If there are any limitations, Dr. Jewett can state what they are.

Mr. Blackman: That is just the point I want to develop, if there are any.

Mr. Haight: In the meantime we will refer to that as Defendant's Deposition Exhibit No. 1, merely as a matter of identification.

The Witness (continuing): Referring to a pamphlet purporting to be published by the Western Electric relating to No. 12—A Loud Speaking Telephone Outfit—I agree with the following as of the time it was written:

"Recent developments in vacuum tubes and vacuum tube

amplifiers have made it possible for the engineers of the American Telephone & Telegraph Company and the Western Electric Company to design what is now known as the No. 12—A Loud Speaking Telephone Outfit, a practical device that will successfully meet the severe conditions of railroad service."

I think from looking at this device, that this thing must have been written some years ago. It says 1/11/24. That statement undoubtedly referred to the fact that by the development of the vacuum tube amplifier, we had placed at our disposal a tool for so amplifying ordinary speech current as to make it possible to reproduce it in a loud speaking telephone such as railroad requirements neces- [fol. 7732] sitated for the guidance of tower operators and other people who could not use ordinary telephones and had to depend upon, if they used telephone at all, had to depend on loud spoken telephonic communication.

Referring to another Western Electric pamphlet—I agree with that statement except possibly in the implication there may be in it that that was a perfect final device. That was written seven or eight years ago. If I agree that that was a perfect final device, I would be agreeing with something that I do not believe now.

I will read it into the record.

"With the permanent place that radio has attained within a comparatively brief period in the daily lives of thousands, new standards have been established not only by those engaged in the design and manufacture of apparatus but by the public as well. Those who were once satisfied to get 'something' by wireless—no matter how weak or how imperfect the reproduction—soon demanded volume enough to fill a room; then that quality and naturalness of reproduction that make music and speech a real pleasure; and now there is demanded an efficient cabinet type of loud speaking telephone that will please the eye.

"This last requirement is met by the No. 14—A Loud Speaking Telephone Outfit which makes use of the latest developments in the electrical communication art and is mounted in an attractive and unobtrusive cabinet. It is a combined audio frequency amplifier and loud speaking telephone. When used as an adjunct to vacuum tube radio receivers, it provides amplification sufficient to make received radio programs audible practically without distor- throughout a large room."

Referring to a pamphlet marked "Speech Input Equipments for Use With Wire Lines as an Adjunct to Radio Telephone Broadcasting, Western Electric Co. published in U. S. A. 1925"—I agree with the statements marked on pages 1 and 3. I assume that the Western Electric at the time this pamphlet was issued did have these things available. The portions referred to are as follows:

"To provide means whereby events that take place in points remote from radio telephone broadcasting stations may be transmitted to the radio audience. Western Electric Speech Input Equipment, in a number of types, have been [fol. 7733] made available to meet practically any condition that may arise."

That was on page 1. On page 3 the following:

"One of the important requirements imposed by the companies of the Bell System, in order to avoid interference with other lines, is an upper limit to the power level delivered to the lines by the speech input equipment. The volume indicator which is described below is an instrument which may be used to indicate the level put upon the lines."

The only qualification that I would make to that paragraph is that this word "events" in here must refer to speech events; it does not refer to visual events; it is a speech event.

The next pamphlet is one entitled "Amplifier No. 6034-A," bearing upon its upper cover also the legend "A Western Electric Product." The matters are the two appearing on the first page and I agree with them.

The first part is as follows:

"Western Electric Amplifier No. 6034-A. A development of Bell Telephone Laboratories, Incorporated, the Research laboratories of the American Telephone and Telegraph Company and the Western Electric Company."

Below that:

"To provide a means of making entertainment from phonograph records available in rooms of average size or in widely separated areas, some method of amplifying the entertainment electrically and transmitting it by the same means is required."

The next is a pamphlet, Western Electric Company No. 10-A, Loud Speaking Telephone Outfit, and I agree with the statements within the poetic license of the man who

wrote this first paragraph as to what constitutes pleasure. The portions referred to are as follows:

"Western Electric, No. 10-A Loud Speaking Telephone Outfit. The widespread interest displayed in the receiving of broadcasted news, music and entertainment by means of private radio telephone installations has brought with it a demand for certain auxiliary types of equipment. Foremost among these is the loud speaking telephone outfit which is capable of amplifying the output of a radio receiving set so as to satisfactorily fill a fair sized room with speech or music. In providing facilities for all members of a family group, for other gatherings, to enjoy the entertainment, the greatest satisfaction can usually be obtained by providing [fol. 7734] a good loud speaking telephone outfit. The proper design of an efficient radio speaking telephone and its associate amplifier represents one of the highest achievements of the electrical and acoustical arts as they exist today. For several years past the engineers of the Bell System, that is, of the American Telephone & Telegraph Company and of the Western Electric Company, have carried on extensive investigations upon the loud speaking telephone with the object of developing a wide variety of public address systems. On the basis of those investigations the Western Electric Company is manufacturing a loud speaking telephone outfit suitable for use as an accessory to a radio receiving set."

The next one purports to be a pamphlet issued by the Western Electric Company and bears upon its outer face the legend "The No. 2-A Audiometer, a Western Electric product." I agree with the statements marked except in so far as those statements imply that the audiometer was developed for purposes outside of the telephone business. The statements are:

"Western Electric No. 2-A Audiometer. A Development of Bell Telephone Laboratories, Incorporated, the research laboratories of the American Telephone and Telegraph Company and the Western Electric Company.

"The importance of accurately determining the acuity and quality of hearing in delicate functional and diagnostic examinations has long been recognized. Taking advantage of the possibilities of the use of electricity in sound measurements and drawing upon its experience in designing ap-

paratus providing electrical means for amplifying and transmitting sound, the Bell Telephone Laboratories has developed for the Western Electric Company several different types of Audiometers capable of meeting a wide range of requirements."

The audiometer was developed in its fundamentals primarily as a tool to assist in the proper development of telephone transmitters and receivers. It is essentially a device which permits of the accurate quantitative measurement of response of the human ear to frequencies over the entire range and in values within the range of the human sense of hearing. A knowledge of these fundamental characteristics of the human ear, both in persons of normal and persons of abnormal hearing, is absolutely essential to a proper de- [fol. 7735] velopment of telephonic apparatus, particularly transmitters and receivers, and the audiometer was devised as a tool in the solution of a purely telephonic problem. The fact that it did give a means of measuring acuity and quality of hearing for other than telephonic purposes was purely incidental although of very great importance in the medical world and the instruments to which this paragraph refer were the reductions to practical form for use by aurists of the apparatus previously designed purely as a tool in telephonic research.

The next pamphlet is one bearing upon its face the legend, "Western Electric Public Address Systems." I agree with the statements, marked on pages 3 and 5, with the same reservation as in the preceding question to any modifications that these instruments were designed primarily for the Western Electric.

My explanation is that the loud speaking telephone was designed primarily as an adjunct to the service of the Bell System to make possible the transmission at a distance the spoken word of orators or speakers in a distant place. The statement at the bottom of page 3 in reference to the Madison Square Garden exercises at the time of the burial of the Unknown Soldier is a very good illustration of the objective which we have in designing loud speakers for use in connection with the telephone plant and as in the case of the audiometer, having designed loud speakers and employed them in the telephone plant, the usefulness of the same things for more local purposes led to the development of the things which are described, I presume, in this bulletin.

The parts referred to are as follows:

"Western Electric Public Address Systems. A development of Bell Telephone Laboratories, Incorporated, the research laboratories of the American Telephone and Telegraph Company and the Western Electric Company.

"Introduction. Ten years ago the Western Electric Company made available the first Public Address Systems to provide means whereby speech could be delivered clearly and faithfully to large assemblies of listeners, numbered in thousands instead of the mere hundreds, who formerly constituted the audiences within the range of full audibility.

"During this decade four Western Electric Public Address Systems were developed and introduced covering every commercial need that has arisen. Each of these systems was preeminent in its class and generally selected [fol. 7736] where insistence was placed upon dependable, flexible and simple operating equipment with ample volume and clarity."

The next part of page 3 to which attention was called reads as follows:

"From the first large installation in old Madison Square Garden, where the audible services in honor of the Unknown Soldier were reproduced in 1921 down to the present long roster, careful analyses have been studied, practical tests made and on the basis of the findings, improvements effected."

The part referred to on page 5 of this pamphlet reads as follows:

"Systems Nos. 5, 6, 7 and 8 still further enhance the value of Western Electric equipment because of the much larger areas it is possible to cover, the extreme simplicity and dependability of operation at all times, the perfect tonal quality of voice or musical instruments as transmitted alone or in combination, by the great advantage of A. C. operation by greatly improved loud speaker units and projectors and finally because of the important fact that design, workmanship and performance of each part which make up each system are based upon the Western Electric Company's and Bell Telephone Laboratories' knowledge, experience and reputation as pioneers and leaders in the field of sound transmission apparatus, as evidenced by the tele-

phone and telephone apparatus that are the standard for the world."

With reference to the words "Is it available," in that first sentence, the Western Electric Company made available, and the observation is that available there refers to the Western Electric Company as a manufacturer of equipment and not as an originator of the idea of the development of a loud speaker, which was a problem that arose in the American Telephone & Telegraph Company.

The next pamphlet is one which, upon its outer cover, bears the words "The No. 1-A Stethoscope. A Multiple Electrical Stethoscope," parts upon page 1 and on page 3 are further parts ending at the top of page 4. I find myself in a position not to make a categorical acceptance or denial of the statements, although in general as a piece of advertising literature I think the statements are substan-
[fol. 7737] tially correct. On page 1 the title is: "The Western Electric No. 1-A Stethoscope, a Multiple Electrical Stethoscope."

"Since its discovery by Laennec over one hundred years ago the stethoscope has proved indispensable in the study and diagnosis by auscultation of pathological conditions of the heart and lungs. It has long been recognized, however, that the stethoscope in its various forms has certain natural limitations and improvement has had to wait upon electrical research, development and adaptation."

As regards that paragraph 1, not being a physician, have no knowledge of the gentleman who is supposed to have invented the stethoscope, nor the time at which the stethoscope was invented, so I am not in a position to comment on that.

The next quotation is:

"The development of the vacuum tube amplifier gave rise to hopes that the stethoscope, purely a mechanical device, might be improved. Early experiments indicated that heart and chest sounds could be magnified and reproduced faithfully by electrical means but certain difficulties experienced with early forms of vacuum tube amplifiers had to be overcome before reproduction by this means could be made satisfactory."

I have no comment on that paragraph. So far as I know

it is entirely correct. The next quotation is at the top of page 3:

"These difficulties resulted from the fact that the amplifiers were efficient at low frequencies and over-emphasized the higher frequencies. In addition, the combination of the ordinary telephone mechanism and an amplifier was shown to be impracticable inasmuch as the telephone employed a carbon transmitter producing noise which, when amplified with the body sounds, is annoying and tends to obscure the latter."

I have no comment with regard to that paragraph. It is a statement of fact, as I understand it. The next paragraph is:

"The elimination of these obstacles to the development of an efficient electrical stethoscope has been accomplished by research work carried on for a long period in the laboratories of the American Telephone and Telegraph Company and the Western Electric Company. Of primary importance has been the development of a special vacuum tube amplified. This amplifier combines enormous amplification [fol. 7738] capacity with practically distortionless reproduction over the entire range of frequencies, of interest in auscultation. The development of a special electromagnetic detector or transmitter eliminated the difficulties inherent in reproduction by carbon microphones. The development of the electrical filter by the same research organization also made possible the suppression of sounds outside of the band of frequencies to which it is desired to listen."

My comments on that paragraph are that they first make clear that the research laboratories referred to at the time this pamphlet was written, published in January, 1925, refer to the laboratories' predecessor to the formation of the Bell Telephone Laboratories, Inc., but more particularly they refer to the fact that the special vacuum tube amplifier referred to here is merely an outgrowth of the development of amplifiers for the same general purposes for use in the telephone business quite aside from any use in the medical field as stethoscopes. Our own problems required us to have, if we could have them, amplifiers which would do identically what is here described and they were developed for that purpose, and the fact that these same amplifiers, or slight modifications, were found to serve the purpose in

the medical field is an incident rather than an objective in the development of amplifiers, and the same applies to filters.

This is the next quotation:

"These three basic developments, supplemented by study and research devoted to the producing of undistorted sound transmission and several years of work in collaboration with specialists in auscultatory diagnosis resulted in the solution of these important problems in the form of a multiple electrical stethoscope known as the Western Electric No. 1-A Stethoscope."

I have no comment on that last paragraph, which is a statement of fact. The application of the things developed in the telephone field to practical, useful forms in the medical field require the co-operation of the research, physical research people with the specialists in the medical field who knew what it was that they wanted to obtain, so that statement, as far as I know, is correct.

The last of this series is a pamphlet bearing upon its outer cover the words "Public Address Systems Nos. 1-A [fol. 7739] and 2-A Western Electric Company." Parts on page 3 two instances and on page 5, one instance. I agree with those observations and statements except for a comment on the first paragraph of which I have no understanding, as to how long the need for this thing has existed. The author says 20 centuries. I don't know whether it is 20 or 40 or 100.

Except for that comment, I agree with those statements with the same reservation which I made,—same explanatory reservation which I made with regard to the preceding similar one on public address systems as to the origin of the need for those things, and this is purely a reduction to practice in more detailed form of uses outside of the purely telephone field.

The material to which attention has been called reads as follows:

"Western Electric Public Address Systems Nos. 1-A and 2-A. The well known and widely used Western Electric Public Address Systems Nos. 1-A and 2-A have been designed to meet a need that has existed for twenty centuries but could not be satisfied until their advent."

The second occurrence referred to on this first page is as follows:

"The necessity for artificial amplification and direction of sound was obvious, so the research engineers of the Bell Telephone Laboratories, Inc., the research laboratories of the American Telephone & Telegraph Company and of the Western Electric Company addressed themselves to the task of developing a system of loud speaking telephones that would meet the need."

The parts on page 3 are as follows:

"The efficiency of this system was demonstrated during inauguration ceremonies of the late President Harding on March 24, 1921, when by its use an audience of more than 125,000. * * *"

March 24th Well, that is written that way, but it is obviously a misprint.

"* * * by its use an audience of more than 125,000 people gathered before the National Capitol at Washington was enabled to hear distinctly the President's Inaugural Address."

The next occurrence on the page is as follows:

"Where the number 1-A public address system can be used to amplify and project sound: In large auditoriums, [fol. 7740] stadiums, baseball and football fields, outdoor mass meetings or political meetings and announcements of election returns, armories, mines, steel mills and other large industrial enterprises, vehicular tunnels, steamship piers, to handle large crowds by police and fire departments, production of motion pictures, drill grounds and training camps, railroad and trolley terminals, large building and construction enterprises."

And the item on page 5 is as follows:

"Where the Western Electric No. 2-A public address system can be used: Hotels, for use in banquet halls, for reproducing music of an orchestra in as many locations as desired and for paging guests or making announcements in cases of emergency. Theaters and other auditoriums, stock market and trade exchanges, colleges and schools, for use in large lecture rooms, for emergency announcements, for directing class drills, dance halls, steamships, steamship piers, department stores, prisons, hospitals, county fairs,

private Pullman car or automobiles so audiences assembled around them may be addressed."

I have here a bulletin of the National Research Council which is a subsidiary, if I can use that word, of the National Academy of Sciences, which latter is the only nationally chartered scientific organization in the United States. It was organized just prior to the United States entry into the World War as a piece of machinery to be operated for the national good under the aegis of the National Academy of Sciences and designed to provide for the mobilization of the scientific knowledge of the United States in all its fields, for matters concerned with the national defense, national welfare and the stimulation of pure and applied science.

It functioned during the war largely under specific Presidential proclamation as the scientific, central scientific agency of the Government, and subsequent to the war it has functioned as a part of the National Academy of Sciences for the development of fundamental and applied scientific research.

In carrying out those functions in this present or peacetime capacity it operates through a number of divisions, representing roughly the divisions, the general divisions in the fields of pure and applied science, which divisions are constituted of representatives designated by the national [fol. 7741] societies in the respective fields and appointed by the National Academy of Science under the powers of its national charter.

Each division of the National Academy of Sciences has a chairman, not a permanent chairman, but one appointed for a number or a period of years, and always a very prominent man in his particular field who devotes his time during his appointment to the affairs of the Academy and he receives a salary for his services.

The chairman of the several divisions and certain members of it constitute the council of the National Academy of Science.

It occupies and is the joint owner of a very large and monumental building in Washington not far from the Lincoln Memorial, which was made available to it and to the National Academy of Science, its parent organization, through the munificence of one of the national foundations.

I was instrumental in the formation of the National Research Council partly because of my membership in the Na-

tional Academy of Science and partly because of my activity in the general field of science. For a number of years I was the chairman of its engineering division but at the present time have no official connection with the National Research Council, although I am still actively interested in its work.

In connection with my chairmanship of the Engineering Division I would make this qualification with regard to the statement above, the statement preceding, as to emolument, by saying that the Engineering Division of the National Research Council is different from any of the other divisions in that its chairman does not devote all of its time to his work nor does he receive any emolument, the emolument in the case of the Engineering Division being paid to a permanent officer who is known as the director of the Engineering Division and he receives the same salary as the chairman of the other divisions.

This peculiarity in the case of the Engineering Division arises out of the vast field to be covered by the division and from the fact that men of prominence in the engineering field, in general, are not available for permanent service even of a temporary duration, as chairman.

I find in the list of industrial research laboratories of the [fol. 7742] United States appearing in this bulletin, the Bell Telephone Laboratories, Inc., and many other concerns.

Without having looked over this long list of industrial research laboratories, I would say that I think they are in three categories; they are the research and development laboratories of industrial concerns, manufacturing business, operating business for private corporations; they are the research laboratories maintained by associations of industries who do not maintain their own complete research laboratories but who have a sufficient interest in common fundamental problems and associate themselves together in the maintenance of a research and development laboratory, which does for the industry all fundamental problems with which our laboratory, for instance, does for us, such examples as the laboratory of the Tanners Industry and of the Canning industry, who I think are probably in here, and also I think in this list probably are industrial research laboratories which are maintained in the research field in much the same way that consulting engineering groups operate in the engineering field. They are research labora-

tories fully equipped either in the general field of science or in specialized fields which undertake to do for clients and for a fee, problems which are submitted to them and in addition, although I think that there are probably listed in this grouping institutions like the Mellon Institute in Pittsburgh, which is a privately endowed research laboratory, which will undertake to provide facilities in which the public in general, industries or individuals can maintain research men at their own expense to conduct specialized investigations.

I presume also that we would find in this list such national and state organizations as the Bureau of Standards.

On one of the pages, 27, ending on page 28, is given what I take it, to be a general summary of the work of the Bell Telephone Laboratories, Inc.

So far as I recollect, I had nothing personally to do with the thing. I was not at the time that this list was gotten out, officially connected with it. I will have to go back and qualify that statement back there. When I said I was not officially connected with it, I said somewhere that I was not officially connected with the National Research Council at the present time; as a matter of fact, that is not so; I am one of the members of the Engineering Division. So far [fol. 7743] as I know, I had nothing whatever to do with this statement. It does describe the activities of the Bell Telephone Laboratories, Inc., as accurately as one can describe in a brief summary form, merely by listing a large number of things in which a laboratory such as ours would be engaged.

The book to which we have been referring is the bulletin of the National Research Council, No. 81, Industrial Research Laboratories of the United States, including consulting research laboratories, 4th edition, compiled by Clarence J. West and Callie Hull. Published by the National Research Council of the National Academy of Sciences, Washington, D. C., 1931. This is a reliable official publication of that organization. There has been given here many manufacturing corporations that have laboratories and I am assuming that their activities are described in a general way at least properly. The activities of the Bell Laboratories, Inc., and the activities of organizations doing laboratory and research work for these various manufacturing concerns as to methods differ not at all from the larger and more efficient research laboratories. In so far as that list

may contain small organizations which are sailing under the name of research and development laboratories they probably differ very much with regard to method and the care which they exercise and the extent to which they go in the study of problems.

As to field, of course, our laboratory differs from probably every other one that is listed in that pamphlet in that our work is confined generally to the field of alternating phenomena whether on materials or sounds and to those adjunct fields which are,—where it is necessary for us to have first-hand and fundamental information as it may apply to the scope of our business.

Q. 182. But generally speaking, doctor, wouldn't you say that these manufacturing concerns that have laboratories such as listed in this official publication of the National Research Council, are engaged in the work in connection with those concerns, of improving their product or their service in reducing costs of production, in developing new fields of application, in developing and availing themselves of by-products and materials, and in developing new products and doing those general things. Would you say that?

Mr. Blackman: I am going to object to that as irrelevant and immaterial, and no foundation for the witness' knowl- [fol. 7744] edge of what the other manufacturers do. I don't want to interfere with anything within reason, but I think that is getting a little beyond.

Mr. Haight: Do you want the doctor to answer the question?

Mr. Blackman: If you want him to.

Generally speaking, these manufacturing concerns that have laboratories, such as listed in this official publication of the National Research Council, are engaged in the work in connection with those concerns, of improving their product or their service, in reducing costs of production, in developing new fields of application, in developing and availing themselves of by-products and materials, and in developing new products and doing those general things, as far as the organizations enumerated in this list relate to the larger organizations or the more substantial associations of organizations.

I would make the qualification, without having examined the list in intimate detail, but from my general knowledge

of research organizations or things alleged to be research organizations in this country, that as regards the smaller of the organizations, there will probably be found a considerable number which operate under the title of research laboratories which are not, in fact, as I understand them, research laboratories. As a matter of fact, there may be listed in that large number in that book things which are designated as research organizations which are not conducting research in the field of physical or chemical science, or, we will call it the field of physical and chemical science, but really are organizations which are operating in the field of business exploitation. I may be wrong as to that last, but certainly there have been in recent years organizations in this country which were known, and organizations connected with some of the larger groupings which were known as research laboratories which had nothing whatever to do with the things which were involved in your question except in so far as they tended to amplify the business of the company.

I am familiar in a broad way with the research and development laboratory work done by such concerns as Du Pont, General Electric and Westinghouse Electric.

Q. 185. With respect to those manufacturing concerns, what is the difference,—of course it is in a different field, but broadly as to character, what is the difference between work [fol. 7745] done by the Bell Telephone Laboratories or the Department of Development and Research of the A. T. & T. Company from the work done by and for those manufacturing concerns, by their own laboratory?

Mr. Blackman: I object to that as irrelevant, immaterial and incompetent, and no foundation *laid for the witness'* knowledge as to the details of the operations of other research organizations.

In one very important particular I would say that the work of our research organizations, and I use the words "research organization" because, as I testified yesterday, the Department of Development and Research, A. T. & T., and Bell Telephone Laboratories in their operations are essentially one thing. I will say that in one important particular this research organization of ours is unique and without any corresponding parallel in any other industry that I know of in that our primary function and the thing which is the guiding and impelling motive for our work is

the development of the art and operation for the electrical communication business, is not primarily the development of physical things except in so far as those physical things are a factor in the giving of a better, cheaper and more extensive telephone and telegraph, generally, communication service in the electrical field to the people of the United States, and every act which we do in our broadest and most general function is viewed against the necessity of the operating units of our business and not against the operations of a manufacturing organization. We are not primarily seeking to develop things to sell to an ultimate consumer. What we are attempting to do is to develop a service to be sold to an ultimate consumer and the manufacturing side of the business and the work of the research organization which touches on that side is an incident to the main objective and not the primary, impelling force back of that organization. In practically all other research organizations with which I am at all acquainted, the primary object is the development of things, in the case of manufacturing organizations such as those you have mentioned, or the development of uses of things which others have developed in the conduct of one business, but in no other organization either in this country or elsewhere in the world do I know of an organization like the research organization of the Bell Sys-
[fol. 7746] tem, where the impelling motive for the vast majority of our work is the development of a service to be sold, with nothing else incident to it. It is a very vast and very fundamental difference, as I see it.

Mr. Haight: In order that what we have been talking about may be identified, I will offer on the record the bulletin of the National Research Council as Defendants' Deposition Exhibit No. 2, of this date.

Mr. Blackman: I object to that as irrelevant and immaterial.

(Bulletin marked Defendants' Deposition Exhibit No. 2.)

Attention was called to an article by myself appearing in the Bell System Technical Journal of January, 1930. I notice at the end an author's note which says:

"The authors wish to acknowledge their indebtedness to a large number of members of the organization for their assistance in the preparation of this paper. It is impracticable to mention all who have been of assistance, but they wish to express their appreciation particularly to Messrs.

O. B. Blackwell, W. E. Farnham, W. H. Harden, H. S. Osborne and W. A. Stevens."

O. B. Blackwell therein referred to is one of my assistants as head of the Transmission Development Department—Engineer of Transmission.

In general, the acknowledgment was made for assistance in the getting together of material for us and in the general scrutiny of the thing. Blackwell's stuff is easy enough to pick out. As I remember it, I surmise that Blackwell had part in connection with cable plant, his work relating to transmission over cables, probably in connection with toll service,—both long and short toll service in so far as they relate to transmission matters. The same with regard to long distance service, so far as it relates to transmission. The same there with regard to open wire and carrier circuits, parts which may have to do with equipment details or with methods of operation, probably not.

Toll cables, certainly, in so far as they relate to transmission.

I surmise that probably Blackwell may have given us assistance with regard to maintenance of toll service in so far as the article may have related to the fundamental requirements which underlie maintenance, being the transmission [fol. 7747] engineer; in regard to international connections, certainly—all of this foreign stuff, connections to Europe, connections to South America.

He gave us assistance presumably in connection with telephone circuits provided for private use in so far as they relate to transmission or to the multiplexing of telephone lines for telegraph use; the transmission side of telephone networks for program transmission in radio broadcast; telephony in connection with air craft operation, ship-to-shore telephony, the transmission side of electrical transmission of pictures, the fixing up of the lines, telephony to other mobile stations, telephone public address systems, and the line side transmission side of anything having to do with experiments on television.

R. W. King is the assistant technical representative in my department, resident in London.

There is an article appearing in Bell Telephone Quarterly for October, 1928, entitled "By-Products of Telephone Research," by R. W. King, which begins on page 304 of that publication and ends on page 312. At the time this article was written, Mr. King was not in my department. He was

in the Information Department at that time, although some years previous to that he had been in my department, and he came back to my department for this service abroad. I would have to read this article. Will do that and put answer on the record later.

Referring to the article which appears in the Bell Telephone Quarterly of April, 1924, beginning on page 65 and ending on page 75, by R. W. King and G. W. Southworth, I agree with the following:

"Research helps to give not only better service at a reduced cost to those who use the telephone but also increases the variety of services offered. It is important, therefore, not only to the executives of the System but to the telephone user because it assures him the best service our knowledge of natural laws makes possible. It furthermore safeguards the investor and assures him that those spending his money have the broadest view of what science holds in store and that, as new discoveries are made, they will be woven into the plant, which his money has built, with the maximum of efficiency and economy and in such a way as to yield the best returns.

There are several methods of depicting a corporation's [fol. 7748] business and financial standing. One of these, and perhaps the one most usually appealed to, is the balance sheet. But the balance sheet tells of the past while research forecasts the future; and the Bell System, while proud of its balance sheet, faces the problems and opportunities of the future with the largest research development staff in the world, with a successful record of achievement behind it."

The next article appears in the Bell Telephone Quarterly issue of July, 1928, an article by myself. I agree with the first two paragraphs, as follows:

"The Telephone Switchboard—50 Years of History."

"Reduced to its fundamentals the physical plant of that vast thing we designate as the 'telephone system' centers about three elements, namely, the subscriber's substation apparatus with its transmitter and receiver for projecting and receiving sound and its bell or other signaling apparatus for attracting his attention; the wires or other transmission channels which serve to carry the electrical impulses to and from the subscriber's equipment, and the switchboard which serves to interconnect the subscribers' equipments in

any desired manner at any desired time and at the behest of users.

The innumerable multitude of intricate physical things involved in the make-up of the modern telephone plant are merely adjuncts required to insure the proper functioning of one or other of these elements. The widespread and far-reaching activities of manufacture and supply incident to the telephone business are merely the means by which we provide these fundamental elements in the quantities at the times and in the places required by the demands of the great telephone using public."

And turning to the next page (150) it continues:

"The hundreds of thousands of men and women who spend their lives in the telephone service are in the last analysis the providers, maintainers and operators of these three essential elements."

With respect to the next article which is one appearing in the Bell Telephone Quarterly issue of January, 1929, which begins on page 9 and concludes on page 24 and is entitled "Standardization in the Bell System," signed by H. S. Osborne, one of the engineers in the Department of Opera-
[fol. 7749] tion and Engineering, I will be very glad to read it.

I will also read the next article, one appearing in the Bell System Technical Journal of October, 1925, beginning with page 545, entitled "Engineering Planning for Manufacture," by G. A. Pennock. The part within the pencil lines on page 545 and the part on page 552 and ending on page 554.

Appearing in the Western Electric News of November, 1929, is an excerpt from an article which is entitled "Europe to America by Cable," and is supposed to be excerpts from an interview with the chief of the Bell Telephone Laboratories by Frank Parker Stockbridge in Popular Science Monthly and it purports to be a quotation from me, and I will read it as it appears in this article:

"Out of our laboratory," said Dr. Jewett, "have come such inventions as the Orthophonic Victrola, electrical recording of phonograph records, talking motion pictures, television, aids to the deaf, measuring apparatus for the medical profession, the artificial larynx and a host of others, all of which have resulted from our efforts to improve tele-

phone service. Many of our research men have achieved international reputation as the result of some of these by-product applications. All over the world, the names of Dr. Harvey Fletcher, Dr. Herbert E. Ives, Dr. O. E. Buckley, Dr. H. D. Arnold and others of our staff are known to scientists."

I don't remember that interview. It is true that all of those things have come out of our laboratories and it is true that some of these men like Dr. Fletcher and Dr. Ives have derived their reputation primarily because of the publicity that has been given to these so-called by-products.

Of the four it is certainly not true with regard to Dr. Arnold and Dr. Buckley, and I presume in the case of Dr. Fletcher. Dr. Fletcher outside of the communication field is known primarily because of his work in connection with the aids to the hard of hearing. He is so well known, in fact, that he has been president of the National Association of—I don't know what the exact title is,—which consists of those engaged in aids to the hard of hearing including the medical profession, and he arrived at that distinction because of the outgrowth of his work in the development of the telephone transmitters and receivers and in the meth-
[fol. 7750] ods of making measurements on which they are based. He is our leading expert on such types of equipment, that is, telephone transmitters and receivers.

By Mr. Haight: From the same article I will endeavor to read this:

"I asked him for specific examples of how problems have been tackled and solved under his direction.

"'A good example is the research which resulted in substituting electrolytic iron dust for bundles of soft iron wire as a core for telephone loading coils,' he said. For years we had to maintain an enormous wire drawing plant, using diamond dies to draw the iron wire. The cores were expensive and difficult to make. A young man named Buckner Speed came to me with the suggestion that cores could be made of electrolytic iron dust, highly compressed, if some way were found to insulate each dust particle so as to get the same effect as a bundle of wires. I authorized work to be done on this problem with the result that an iron dust type of core electrically much better than the iron wire core, was evolved in the laboratory. That was one of the first improvements on the loading coils invented by Professor

Michael Pupin and developed commercially in our laboratory. And the Pupin coil, in turn, was the beginning of long distance telephony. By 'loading' the telephone circuit with inductance coils spaced at proper distances apart, the distortion and losses of the impulses in the wire are corrected. Professor Pupin worked out an engineering method for doing this and patented it. We bought his patent and turned over to Dr. G. A. Campbell and Dr. E. H. Colpitts the task of finding out how to make coils of high inductance, low energy loss and low cost and how to install and maintain them on telephone lines in accordance with Pupin's rule. They did a really brilliant piece of research involving the need of devising new types of measuring instruments. That work has been going on for many years with increasing results."

Answer. "That is substantially part of the thing I testified to this morning."

There is one thing that I was quoted as having said there that I certainly would not say now and that is the reference to the beginning of long distance telephony. That depends entirely on what your definition is of long distance telephony, because at the time of the loading coil, they were already [fol. 7751] talking many miles over circuits. It depends entirely on what you mean by long distance telephony. Its meaning has lengthened as the years have gone on.

Referring to an article entitled, "The Day's New Marvel," "Talking Movies Talk and Move Most Naturally in Western Electric's Latest Development," in the issue of June, 1926, of the Western Electric News, page 19, which reads as follows:

"The system represents successful combination and conversion to motion picture use of three major research developments.

"The first of these is the electrical system of recording. This method employs a high quality microphone of an improved type, electrical amplifying apparatus, and a record cutting mechanism. Recording may be carried on at considerable distance from the source of sound so that the actors may be grouped naturally in any scene and need not be crowded before a microphone.

"The second essential feature is a remarkable electrical reproducer which converts the movements of a needle in the grooves of a sound record into electrical vibrations. The

electrical currents from this device pass into an amplifier and then operate a high quality loud speaker of an improved type, capable of filling practically any motion picture auditorium.

"The third development is the link between the reproducer and the audience in a theatre. An adaptation of the public address system makes it possible to pick up electrical vibrations from the reproducer, amplify them, and by means of properly located loud speaking telephones, transform them into sound. The loudness is so regulated as to give the delusion that the source is the actors whose pictures appear on the screen. In the case of musical programs a specially constructed loud speaking telephone insures the correct volume and naturalness."

I have no quarrel with it as a general statement. I think I have testified to all the elements before.

By Mr. Haight: Dr. Jewett, there is a rather long article appearing in the Western Electric News, issue of January, 1919, entitled, "Enter Multiplex Telephony and Telegraphy," by you which purports to be as chief engineer. I would like to put that in the same category as the others that have been marked and place it on the record later. The [fol. 7752] volume is Volume 7, No. 11, for January, 1919. The next one I would like to put in the record on the same understanding. It appears in the Western Electric News, Vol. 3, No. 4, issue of June, 1914, and headed "Engineering Department of the Western Electric Company," by F. B. Jewett, assistant chief engineer, and the question will be if that is correct.

In the Bell Telephone Quarterly of the issue of October, 1922, I find an article purporting to be by O. B. Blackwell, beginning on page 12, "Notes on Radio" is its heading, and it ends on page 25. In view of its length, I would like to ask the same question as before and have the answer put on the record later, as counsel has kindly agreed in the other instances.

Mr. Blackman: Do not misunderstand me. I have not agreed that they be put on the record. I have agreed that Dr. Jewett will answer your question and that you can offer them in evidence if you desire at a later period. Really I feel that this is padding the record to such an extent that

although I like most of these articles, I may feel that I will have to object, but we will not make any technical objection to your mode of procedure. We will facilitate you all we can in getting your offer on the record of the paper, if you want it.

Mr. Haight: That will be sufficient.

I subscribe to the general statement in the marked paragraph in the Bell Telephone Quarterly issue of July, 1931, an article entitled, "The Development of the Microphone," by H. A. Frederick, presented at the Fifth Meeting of the Acoustical Society of America, Camden, N. J., May 5, 1931, as part of a symposium on microphones, page 183 thereof. I am not in position to testify as to the specific details of the work referred to as that of Wente and Crandall, as I do not identify that work, but as a general statement and under the conditions and limitations which he sets forth there I think it is a fair statement.

The material referred to is as follows:

"About 1915, the vacuum tube amplifier became a potent influence on the development of microphones for certain applications, particularly where cost was not important. It did two things, it made it feasible to use, in these applications, a microphone of low sensitivity or efficiency and it created fields of usefulness for instruments of this type. It [fol. 7753] shifted the emphasis, at least in places where low cost was not a controlling element, from a magnitude of output basis to quality or faithfulness of reproduction, uniformity and reliability. In addition, it offered possibilities of exact measurements of acoustic effects if used with a suitable microphone. This influence was almost immediately reflected in the development of a very high quality condenser microphone by Wente (Fig. 21). This instrument was developed for use in such acoustic researches and its commercial applications were developed later. The faithfulness with which it reproduced sounds over a very broad range both of frequency and intensity represented a vast improvement over the previous microphones. It was later improved by Crandall (Fig 22), has received much commercial application and is used as the transmitter of the International Reference Standard with which the volume efficiencies of all commercial telephone transmitters are compared."

In Department of Development and Research of the A. T. & T. Co., leaving out all questions of personnel, there may

have been slight changes in designation, but certainly as regards its main divisions, it is the same form of organization as I found it when I came to be its head,—and largely of the same personnel at the heads of those departments. Its general field has been the same, except as that field has been added to by new developments.

Mr. Haight: We offer in evidence an organization chart as above identified, as Defendants' Deposition Exhibit No. 3 of this date.

(For deposition of John Edward Otterson, see Abst. Vol. IV, pp. 1239-1256. For deposition of Hugh Blair-Smith, see Abst. Vol. III, pp. 849-880.)

[fol. 7754] Depositions Resumed

January 11, 1932, at 195 Broadway, New York.

THEODORE G. MILLER, for defendants.

Direct examination.

By Mr. Haight:

I reside 520 East 86th St., New York; I am vice-president A. T. & T. and have been for about two years; I have been with company since September, 1904; I have charge of Long Lines Department; I was first general manager and then vice-president; I became general manager of Long Lines some time after 1923; I have been vice-president for about two years; became general plant manager of Long Lines about 1919; prior to 1919 and from about 1913, I was division plant superintendent of Long Lines, Chicago.

Long Lines services consist of toll message and special contract, both telegraph and telephone. Special contract services are further classified as full time telegraph service, short period telegraph service, and the same thing with reference to special contract telephone service; also telephotographic service, which is in effect a message service and not a special contract service.

I now remember an additional program service for broadcasting; also, we rent wires to the Government and to aircraft operating companies in connection with aircraft operations.

We rent public utilities, power lines and oil pipe concerns a service under special contract service—loading coils and

repeaters. There is not very much of it and it is rather special.

The service of telephone circuits provided for private use in long distance service is classified as special contract. That is either full time or short period telephone service.

With respect to full time telegraph service, we rent circuits to anybody, such as press associations, brokers, banks, manufacturing concerns, government departments and aircraft operators.

As to short time telegraph service, we grant a telegraph [fol. 7755] circuit for a minimum of one hour and then in multiples of hours, covering printer and teletypewriter service. The customer may have a wire and operate it by operators or rent a machine from us.

Teletypewriter service is used both in long time and short time service, and so far as the equipment is concerned, there is no distinction between the two services. Full time is the period of eight hours per day. Full time telephone service covers a period of 24 hours a day. They are private wires. General Motors had one, but we haven't many as compared with telegraph.

Short period telephone service is where a private telephone circuit may be rented for 15 minutes every day or more at a certain period outside of the busy hours. There is, however, little of it. Brokers, manufacturers and newspapers have that sort of service.

We have telephoto-transmitting and receiving stations in several places and transmit telephotos on a message basis. There are not many such customers. The biggest single use is for newspapers. They send pictures, etc.

Program service is broadcasting chains and consists of permanent net works, temporary facilities for special occasions and pick-ups. Our two biggest customers are the National Broadcasting Company and the Columbia. The National has two chains, one of which extends to the Pacific Coast and the other as far west as Minneapolis, St. Louis and so on, and the Columbia has a big chain also which extends to the Pacific Coast.

There are other customers such as the American Broadcasting Company on the Pacific Coast. There are several broadcasting stations that are not on chains but they broadcast to other stations. One in Boston has a little network of its own running through New England. There are several similar ones but not big chain customers.

A railroad can rent a circuit just as any other customer. I am not sure whether any circuits leased from us are used in train despatching. I think most of the telephone circuits that are used for train despatching are owned by the railroad companies. Public utilities, electric power companies and pipe line companies use the service for communication with the intermediate stations regulating service in emer-
[fol. 7756] gencies.

Telephoto services comprise stations in Boston, New York, Atlanta, Cleveland, Chicago, St. Louis, and we connect also with the Pacific Company at Los Angeles and San Francisco. A map would show lines connecting them.

We have separate maps showing the National Broadcasting System and Columbia networks.

Defendant's Exhibit 13 for identification is a map at page 71 of the April, 1931, issue of Bell Telephone Quarterly, which map is contained in the article in said issue entitled "Program Transmission Networks Provided by the Bell System as of March 15, 1931." This map fairly illustrates program networks.

I know that we have reports showing what the revenues of the Long Lines Department are on the toll message business and from the special contract services. I have no reports available showing how much it is for, * * * I know what it is from the broadcasting services. I do not remember ever seeing any reports showing just what it is for the short period as distinguished from the full-time services. We have reports showing revenue on telephotographic services.

We have the toll message revenues segregated from the special contract service revenues. The revenues for telephotography, which is not a special contract service, are segregated from the special contract service revenues. The revenues from broadcasting are also segregated. There are no others. The revenues from the telegraph service are not segregated in any reports that I saw. I do not know whether it is segregated, but when we want to know we estimate what percentage it is of the special contract revenue.

In our department we are not able to separately identify the investments in Long Lines plant with respect to each class of service. We can make estimates of the proportions used in each and we have made such estimates from time to time. In making those estimates we have not segregated. We have estimated the plant,—it would be reasonable to

assume that so much was used for each one, but the plant itself has not been segregated for the accounts. There has been no segregation as to the investment of Long Lines as between toll message uses and special contract services. [fol. 7757] Mr. C. Morsack is the auditor and has charge of the books. Arrangements between Long Lines and customer with reference to special contract services are shown by written contracts. I can produce a form of contract for each service. The contract specifies the periods of the service to be furnished in the case of both telephone and telegraph special contract service. Telephotographic service is message service and is sent just like a telephone message.

There is a contract different from the special service contract covering program broadcasting. There is a form for permanent facilities and one covering temporary or recurring service. I will produce the forms of contract with respect to the different special services, including railroad forms.

The Illinois Bell gets a commission on all calls originating in its territory and they get payment for the use of trunks for all classes originating in its territory and they get a pro rate of the revenues for the plant within the City of Chicago. For special contract service they get a pro rate and also a commission. They also get a pro rate out of full time and short period telegraph service. They get paid for the plant they furnish. They furnish all the plant in the City of Chicago.

The compensation of the Illinois Bell in relation to full time and short time telegraph service is different from other cities because Illinois Bell owns the plant. There isn't any special pro rate, however. The pro rate is simply upon the value of the plant in Chicago used generally in the long distance service. It has no relation to the revenue received by the Long Lines for full time or short period telegraph service. The same applies to full and short time telephone service and as to telephotographic program and other special services.

Q. 102. Now, are any of these special services rendered direct to the user from the Long Distance tollboard or are any parts of it rendered through the exchange offices in Chicago?

Mr. Blackman: I shall have to object to this line of exam-

isnation. You are getting into a subject that is not before the court, as I understand it.

Mr. Haight: Then I do not read the opinion right. We think it has relation to the property that is used in these [fol. 7758] various offices, and it has pertinency to the matter of segregation.

Mr. Blackman: You have a right to press your question if you want, but I make my objection on the ground that it is incompetent, irrelevant and immaterial.

The special services are rendered by lines from the long distance toll board to the offices of the customer. Whether the plant which the Illinois Bell furnished for those services between our central office to the customer's offices happens to go through some of their exchanges, I don't know, but the customers do not come to our central office to get their special service, it is taken at their premises. Special wires, for instance, go through a loop furnished by the Illinois Bell to the long distance tollboard, from the customer's premises. Telegraph service both full time and short period are handled in the same way. These loops may go through the exchange boards first. The full time telephone and short period telephone are handled in the same way as telegraph services. They carry direct to the customer. They terminate in the customer's premises. The cables from the customer's premises in many cases are operated through the exchange offices but the loops are routed direct from the tollboard to the customer's premises. The same is true with reference to program service.

The billing for these special contract services is direct from Long Lines to the customer.

As to teletypewriters used by the customer in these different services, they are leased to the customer and in many cases the associated company owns, furnishes and maintains them. In Chicago the Illinois Bell owns the teletypewriters. That is true with reference to the equipment used in other special services.

The broadcasting companies own their own stations. I think some of the broadcasting equipment is bought from the Western Electric. Some of the press associations own their teletypewriting machines, but not all of them. Long Lines or associated companies own them and they are furnished under a contract.

Teletypewriters used by broadcasting companies on their telegraph wires would be furnished by Illinois Bell in Chicago. Long Lines makes the leases but Illinois Bell furnishes the apparatus in the City of Chicago; that is, we sign [fol. 7759] the contract with the National Broadcasting Company for a net work all over the country and where teletypewriters are used in connection with their program wire, they would be furnished by the associated companies under the same arrangements as exist with respect to any kind of special service contract. In Chicago we take broker's wire or bank wires, we make a lease with the customer, but we arrange with the associated companies to provide the teletypewriters where they are required. In such cases the customer pays us and we pay the associated companies.

On special contract services the associated companies get a commission on a regular schedule basis on the revenues from the contract. That is true with reference to Chicago. The situation in Chicago is special with respect to commissions for message services. There is a regular basis for the commission which is the same on all messages while there is another schedule for the business that originates elsewhere.

Assuming that the Chicago Tribune at Chicago has special press service, the Illinois Bell would furnish the teletypewriters and there is a separate rent for the teletypewriter as distinguished from the rent for the use of the lines. The rent for the teletypewriter is paid to the Long Lines if it is in connection with a Long Lines contract. Long Lines keeps it. I could not answer whether Long Lines pays anything to Illinois Bell for the use of that instrument. I don't know whether there is any written contract with the Illinois Bell as to compensation on special contract services, but there is a schedule. Mr. Morsack may be familiar with that.

I do not think the schedules are printed but are in the form of letters. Mr. Carter ought to be familiar with those.

I know of no property in Chicago belonging to the A. T. & T. or that is used in the special contract services. There is a contract between the Western Union and the A. T. & T. under which Western Union can obtain wires to use to transmit messages, which has been in force two or three years. There is a similar contract with the Postal Telegraph & Cable Corporation for about the same time. The General Department of A. T. & T. have the custody of those contracts. Long Lines has been furnished with copies.

Long Lines publishes a magazine called Long Lines and [fol. 7760] has done so for about ten years; published each month; Harman Hocker is the editor who reports to Mr. Bood, the publicity manager. I imagine there is a complete file. I don't know whether there is any objection to defendants looking at those.

(Counsel for plaintiff stated they would advise as to whether it will be furnished.)

There was an increase in Long Lines plant between 1920 and 1930 to provide many more facilities for the increase of business. There has been a considerable increase in the various special services. The program service is all new in that period and we have had to increase the plant to provide for that service. There has been a big increase in all special services except telephotographic service, which is the smallest special service. Telegraph business is the largest one and broadcasting is the second. Special contract telephone service is third, but it does not amount to very much compared with the total business.

Our records are kept so that I could furnish the form of special services by classes for the years 1920, 1925 and 1930. I think Mr. Carter knows more about that.

Q. 187. Now, in regard to the toll message service, has there been any general trend of change in that from 1920 up to date?

Mr. Blackman: I object to that; it is irrelevant, immaterial; it is not intrastate service. I think we have gone about as far as we should.

Mr. Haight: It is interstate service in which the record already shows interstate property is used.

Mr. Blackman: Yes, that is true, but here you are going into a question purely relating to interstate business. All the Long Lines services, being interstate, of course.

Mr. Haight: Yes.

There has been an increase in the toll message service between 1920 and 1930. However, the trend lately was different from what it was in 1928 and 1929, but it increased very rapidly up until about two years ago. Since then it has been decreasing. I can furnish the amount of toll message revenue for 1920, 1925 and 1930.

There have been several decreases in the long distance message rates in the last five or six years for everything

in excess of 40 miles. Improvements in equipment or facili- [fol. 7761] ties have had bearing upon such reductions because of ability to handle business more economically thereby, such as development of repeaters, loading coils, cables, switchboards, operating methods.

Q. 201. Have there been any developments of equipments or improvements in equipment in exchange plants that have helped to increase the volume of long distance messages?

Mr. Blackman: You mean exchange plants of the local companies?

Mr. Haight: Yes.

Mr. Blackman: I object to that on the ground that I do not know that this witness is familiar with the details of that; he has not been shown to be.

Mr. Haight: I do not want him to tell us anything he does not know.

I am not competent to answer the question as to whether improvements in equipment in the exchange or local plants have had anything to do with the increase of long distance business. There has been no reductions, however, in the rates for special contract telephone and telegraph services. There have been some adjustments in the rates for printers and in connection with some broadcasting rates—minor reductions, which reductions apply really to some of the accessories rather than the main service.

The auditor of Long Lines makes reports on the financial situation to the comptroller of the A. T. & T.—income accounts. The assistant treasurer makes what we call a cash report to the treasurer. No reports are sent to the comptroller except those specified by the Interstate Commerce Commission. However, there are other reports of cash requirements and provisional estimates made from time to time. I have to do with the provisional estimates and estimated cash requirements reports sent to the comptroller, Mr. Morsack, also. I had to do also with the determination of Long Lines long distance message service rates. Our aim in fixing the rates from time to time was to get a fair return and stimulate as much business as we could by reduction in rates, and to fix a reasonable rate for long distance service. I think we have accomplished that from time to time with these various changes in rates.

The Eastern Telephone & Telegraph Company was

bought by the A. T. & T. and operates in Nova Scotia and [fol. 7762] New Brunswick under a franchise from the Canadian Parliament to construct lines through Canada, and it was purchased to get rights to build a line through Nova Scotia and New Brunswick and for the purpose of connecting it with the transatlantic cable from Newfoundland to England, and it will be by that means that Long Lines will furnish transatlantic cable service.

The Transpacific Company operates the Pacific Coast radio station which now gives a service to Honolulu.

There are a lot of different companies that hold title to Long Lines property, there being one in the majority of the states, one in Illinois. There are probably about thirty of these different companies.

Our engineer, Mr. Pilliod, can give a better idea of what provisions have been made for future developments and increase in Long Lines. He has fundamental plans for providing facilities over different routes and for providing new routes. We have a pretty general picture of the future for about five years. We have had computed for each year the return on investment in Long Lines. Mr. Morsack probably has those records.

Long Lines has a separate headquarters from the A. T. & T. at 15 Dey street, but since 1920 Long Lines has occupied space in the A. T. & T. Building at 195 Broadway, and still occupies space, but it is very little.

The organization chart of Long Lines has been practically the same with slight changes only since 1919. I will produce an organization chart.

I will check up the map appearing on page 69 of Bell System Technical Journal for January, 1930, which map is in connection with the article by Gherardi and Dr. Jewett and is entitled "Special Contract Telegraph Service Furnished to the Press Association Circuits Totaling 24,000 Kilometers are Used Exclusively by the Press Association for Distributing News to Its Customers"; also the map appearing on page 70 of the same publication, being Fig. 55, "Special Contract Telephone Circuits Furnished to a Brokerage Company, 30 Circuits Totaling 38,000 Kilometers with 95 Stations." Also map or illustration on page 73, same publication, above the legend "56" and the words "Routes of Bell System Telephoto Service in the United States."

(The said pages of said publications were marked for [fol. 7763] identification as Exhibits 14, 15 and 16, respectively.)

I will check up the article appearing on page 83 in Bell Telephone Quarterly, April, 1930, entitled "Transoceanic Telegraph Service, General Aspects of," written by me.

CAJETAN MORSACK, for defendants.

Direct examination.

By Mr. Haight:

I reside at West Orange, New Jersey; I am auditor of Long Lines Department, A. T. & T. and have been since spring of 1922.

The business of Long Lines is classified in the accounts into message tolls, special contract service, and telephoto and broadcasting. In general the telegraph service is kept distinct from the telephone service.

I can give information as to the revenues relating to the business as to long and short period telegraph service, full and short period telephone service, telephotographic and program service. We distinguish between telephone and telegraph service. Telephoto is separate. We have certain subdivisions of telegraph service, also. There is a segregation of private wire telephone service. Probably the teletypewriter service can be distinguished. The teletypewriter account covers the revenues derived from special contract services conducted by teletypewriter. I can produce an accurate listing of all those things, and will do so.

Reports of revenues are made by Long Lines to the Comptroller and by the Comptroller I mean the General Department of the A. T. & T. monthly and cover financial results of Long Lines. I could furnish those reports. The forms include balance sheet, income statement, revenues, expenses and analyses of those major statements which appear on other reports. It would take a few minutes to get a set of forms of reports, which I will obtain.

I will produce an organization chart that will illustrate the organization of Long Lines back as early as 1923.

The general treasurer of the A. T. & T. is compensated through the apportionment of charges against Long Lines for general services, which charges amount to 1½ per cent

[fol. 7764] Long Lines revenue. There is nothing in addition to that for general services.

There is an assistant treasurer of A. T. & T. who is part of the Long Lines organization. I don't think there is any employe on Long Lines payroll that is also on the payroll of General Department. The publicity manager in the General Department is not also the publicity manager of Long Lines.

The Long Lines attorney, Mr. Elsasser, is counsel for Long Lines. He has an organization reporting to him. The general counsel of the A. T. & T. does not appear as part of the organization of Long Lines, nor does the tax attorney. However, I don't believe I am competent to answer the relation between Long Lines and the tax attorney and general counsel. The only way I have of knowing whether any one is in our organization is by the payroll. I determine whether any one is in the Long Lines organization by whether that man is paid by the Long Lines.

Our reports include the revenues from special contract service that originate in Chicago, but that revenue is not segregated and it would be very difficult to say where it originates, because there are a number of points involved, any one of which might be considered as the originating point. Obviously we could segregate special contract revenues originating in Chicago, because it is the amount billed on those particular contracts. Only in the sense that the amounts of compensation which the Illinois Bell receives for services and facilities that they furnish in the City of Chicago are apportioned among the accounts, certain amount to special contract service revenue, certain amount to message toll business, to broadcasting, can the revenues attributable to Chicago be segregated. For instance, with reference to the National Broadcasting Company, there are several localities involved in the hookups, one being Chicago. To segregate and attribute to Chicago any portion of such revenues could be done only on an arbitrary basis, and there is no segregation except as I have explained, namely, that the total compensation to Illinois Bell is apportioned to various revenue accounts as pro rate reduction. I can think of no billing made by Long Lines to the Illinois Bell on account of special services.

With respect to special services rendered by Long Lines in Chicago, we make a settlement for the plant and serv-
[fol. 7765] ices furnished by Illinois Bell there, and also we

make a settlement with Illinois Bell for the amount of commissions on special contract services. I think Illinois Bell gets payment for the loop in connection with private wire service, and the amount of the payment is what the Illinois Bell would receive from a similar loop furnished to an outsider. I don't know how much that is. I think I can find out, but I am not sure; what is running through my mind is whether it is the same in all cases. In addition to the payment for the loop, it also gets a commission. I don't mean that the commission represents compensation for the use of the toll plant but what I do mean is that Illinois Bell gets a percentage or share of the revenue which is paid to the associated companies on two-way special contract services, which commission is calculated on the regular commission table depending upon the amount of revenue and contract. There is a schedule covering it. I am speaking of all two-way special contract services. I don't know whether there is a contract but there is at least an exchange of letters. I will get the exact basis and (subject to consent of counsel for the plaintiffs) produce same, so far as it relates to the Illinois Bell in the Chicago business.

The system of paying commissions on special contract service started in July, 1930. Prior to that time no commission was paid at Chicago or at any other point. Prior to that, the Associated Companies were paid for special loops that were used and also a pro rata share for the line haul furnished, which is true at the present time.

In regard to the article in the Bell Telephone Quarterly for April, 1924, written by me, at page 500, describing the accounting system in the Long Lines, I will read the article and advise you whether it correctly described the accounting system at that time and whether such description holds true at the present time.

Mr. Haight: I think at this time the various forms of reports that were asked for have been brought into the room at the direction of the witness and then placed in the possession of counsel for plaintiff. What is your position?

Mr. Blackman: As to allowing you to see these forms, why, we will do that. We have already furnished you with these complete forms and every one of them; you have had all of them in your possession and have had them for many weeks. [fol. 7766] As to permitting these forms to be marked for

in evidence in this case, why, we may have objections to the offer, but so far as seeing them, why, you can see them.

It was agreed by counsel for plaintiff that defendant's counsel would be advised without delay whether pursuant to defendant's demand:

(1) Monthly reports, Long Lines, Nos. 1, 2 and 14, covering the month of December for each of the years 1919 to 1930, both inclusive, will be produced.

(2) Monthly reports, Long Lines, Nos. 1-A, 3, 4, 7, 11, 18, 22-A, 22-B, and 22-C for each of the years 1919 to 1930, both inclusive, will be produced. December monthly reports may be sufficient if that report covers pending months of each year.

(3) Provisional estimates, Long Lines, reviewed by report 22-B from 1919-30, both inclusive, will be produced.

Article entitled "Accounting in the Long Lines Department"—Bell Telephone Quarterly, April 1924, being Defendants' Exhibit 17 offered and received in evidence. That article was written by me, is correct as of the time it was written and as of today, except there have been certain minor changes and one major item change effective January 1, 1932. As to the latter, all the field accounting forces formerly part of the Plant Department have become part of the Accounting Department. The minor changes are of no particular importance.

Up to the end of 1927, the license payments by Long Lines were computed only upon the toll message business. Since that time the computation has been made by taking a percentage of the total revenue of Long Lines less uncollectibles, including telegraph business, all special contract services—total operating revenues.

We compute the return on the investment of the Long Lines Department, as a whole, for all years in the regular course of business for the officials of the company, that is, all the administrative people of the Long Lines Department and for transmittal to the comptroller. Those computations have been preserved and are on these monthly reports. I think Nos. 1 and 22 are the only ones which show that. I do not think any of these reports actually show the computations in the form in which they were computed. This 22-B, for example, shows total telephone earning to aver- [fol. 7767] age plant in service. If we look at 22-A and B

we may get an answer to the question as to each year, the question being what were the telephone earnings on average plant in service.

By "average plant in service," we do not include construction work in progress.

Cross-examination.

By Mr. Blackman:

So far as I can remember, the tax attorney and the general counsel of A. T. & T. were not on the Long Lines payroll, but each of the officers had a force engaged on Long Line work and they were on the Long Line payroll. Mr. Elsasser reports to Mr. Miller not to Mr. Bracelen but at that time this organization chart shows a report to the general counsel. When that was in effect, while the general counsel was not on the Long Lines payroll, a certain force under him was on the Long Lines payroll and paid by the Long Lines and charged to the Long Lines account.

The assistant treasurer A. T. & T. is on the Long Lines payroll and reports to the vice president, his entire salary being paid by Long Lines. Long Lines has a complete organization of its own and pays it own people.

James J. Pilliod, for defendants.

Direct examination.

By Mr. Haight:

Reside New York City; engineer of Long Lines Department since January, 1920; graduated in electrical engineering, Ohio Northern University, in 1908; have been with A. T. & T. practically ever since; with them somewhat before that date.

I will read the article, Bell Telephone Quarterly, January 1923, entitled "Engineering on Long Lines," p. 18, written by me, but my recollection now is that it sets forth the situation at that time, and since the changes have been principally in personnel. Different problems have been presented on account of activities in radio field, for instance. Fundamentally, the engineering problems are not changed. It is merely new additional things brought in, but it is a new branch of our activities. A great deal of it is merely an extension of the older art, gradually merging from the old art into the

[fol. 7768] new. Some changes, however, have been required to be made on account of radio broadcasting.

Our general telephone circuits are all designed for 2-way operations, that is, communication between two telephone instruments one in one location and one in another. The radio broadcast is fundamentally a 1-way transmission service. However, there are occasions when they do 2-way service.

In broadcasting circuits we have a great many stations connected to the same circuit, which is quite different than in the case of telephone circuits where generally you have only two instruments. To that extent it is a slightly different art. However, the same kind of copper wires with necessary modifications are used. Special circuits have been required as any change you might make in a fundamental business requires special attention or special apparatus.

The use of teletypewriter has been developed over a number of years and is one added feature to our activities. They do not in themselves require any fundamental changes, however. Teletypewriter is an instrument to connect on to the end of the telegraph circuit, and the change is really from the telegraph instrument to the teletypewriter instrument. The tendency has been to work at considerably higher speeds with the teletypewriter than was possible by hand operation, which has required an improvement to some extent in the telegraph circuits themselves, to the apparatus connected to those circuits, which has required the replacing of some of the older type of apparatus that might have been suitable for hand speed.

The teletypewriter Private Branch Exchange systems is a board which can be used for terminating a number of circuits to which are connected teletypewriter machines and also telegraph lines to other points either in another city or in the same city. This board is so arranged that the different teletypewriter stations can be connected either to each other or to the line extending out from the switchboard. In Long Lines in the last few years there have been a number of different developments to make the service more efficient and economical to operate; carrier telegraph systems, improvements in methods of operating telegraph service in cables, there have been new telegraph circuits devised; all such have been directed to better and cheaper

[fol. 7769] service. The carrier telegraph system enables us to operate possibly ten telegraph circuits over one pair of wires and to operate telegraph circuits in cables more efficiently.

* * * * * * *

[fol. 7770] HARRY H. CARTER, for defendants.

Direct examination.

By Mr. Haight:

I reside at Pelham, New York; I am general commercial manager of Long Lines and have been connected with Long Lines for about four and one-half years.

So far as I can see, the organization chart handed me as of July 1, 1927, is the organization chart for that year. Except for personnel, it has been the same since, except we have added some field officers at Washington and Detroit, and there has been added also since, a general sales manager. I will produce a later organization chart.

The general commercial representative is not in existence any more. The general sales manager has taken over part of the function that was performed by the general commercial representative and the other parts go to the general commercial supervisor. The general sales manager directs the selling force of the department, makes studies in his section as to market conditions, where the service can be sold, and does the general line of work that a general sales head would do, etc. He has 12 or 14 people on his staff and those engaged in selling are at the present time around 90, which covers the eight or nine field offices, as well as New York.

There is a commercial engineer in the Long Lines who has about 125 under him. He makes estimates of business, makes studies about charges, rates, tariffs and so on. He has to do with the toll rates. They keep data as to the volume of traffic by length of hauls. He has also to do with special service contracts, with developments and rates in connection with those services. I don't think he has anything to do with any commission cases.

The work of the General Toll Development Supervisor would come now under sales manager. Part of the work originally handled by manager of auxiliary services is [fol. 7771] done now by Program Supply Manager and part now by the Commercial Supervisor. The Program Man-

ager handles contacts with broadcasting companies. He has four or five people under him.

In the Commercial Supervisor's section there is the pricing branch for the facilities that the broadcasters desire.

I heard the classification of special contract services given by Mr. Miller, which is true except that the short period telegraph service is confined to teletypewriter service but not to Morse.

I have under me as General Manager about 350 to 360 people.

The Illinois Bell does some sales work with respect to special contract services, being able to close a sale for any of those services, that is, they handle the applicant for service, negotiate for the sale of the service, and the Illinois Bell does that work. If the Illinois Bell is in touch with the customer who desires service from Chicago to New York, as an example, it is in a position to take that contract for that service. In Chicago our own department and Illinois Bell sells special contract services. Likewise the Western Electric, when it was in touch with anybody that wanted our service, would be able to make the sale, because we are engaged in an employees sales campaign, Illinois Bell selling for us and we are selling for them. The Western Electric has entered the campaign.

Long Lines has an office in Chicago handling the selling of toll and special contract services. It is known as the Chicago division of Long Lines. It is a branch of the Long Lines Department like our New York, Washington or Cleveland offices.

I will look up and let you know on whose payroll the employes of the Long Lines are in Chicago. There are possibly 30 or 35 persons in Chicago in the Long Lines Department selling special contract services and long distance toll service for the Long Lines. I have no way of telling how much of the work is long distance toll service and how much is special contract service. Illinois Bell has in its organization what is known as toll and special contract force. I don't know the size of it. There are no regular reports of the efforts of those persons in the Illi-
[fol. 7772] nois Bell doing that work. However, the division office of Long Lines at Chicago has a record of the sales. There is a report to the Long Lines Department

at New York City of the total sales, but that report does not divide the sales made by the Chicago division of Long Lines and those made by Illinois Bell. I have no way of distinguishing what was sold by one or the other. I could go back to the division offices in Chicago and get a division of the sales betwen Long Lines and Illinois Bell. I have never done it, though.

I made some mention of the Western Electric in connection with the selling of services of Long Lines in Chicago. With respect to that, all the Bell System forces are engaged in an employes sales campaign, so-called. In Chicago I assume the Western Electric people, Illinois Bell people and all their forces like Long Lines, are engaged in this and are trying to sell any of the Bell System services, including Long Lines, in Illinois, that can be sold. I know, however, of no specific organization in the Western Electric so engaged.

The Chicago office of Long Lines Department does work outside of Chicago of various kinds; it covers northwestern territory and the mountain states. The headquarters are out of Omaha, Minneapolis, Fargo, North Dakota, and Denver, and runs right up to the Canadian line, and all the group of states made up of the Mountain States Telephone Company territory.

Generally speaking, I assume that Chicago covers the center part of the City of Chicago, and they are in position like every other employe to sell services whether it is there or in the state or any part of the country. When the employers of the Illinois Bell are in a position to take an order for the furnishing of services and facilities that are available, including program service, they quote the the rate for the facilities. There is a continuing program supply furnished after the sale is made in the case of program service. I think both Illinois Bell and Long Lines furnish that service. The Long Lines have some continuing services in Chicago.

The National Broadcasting Company network and the Columbia network both have stations in Chicago broad- [fol. 7773] casting programs daily. I could get the information as to amount of the service rendered by the Illinois Bell in Chicago and as to that service rendered by the Long Lines; that is, how many stations are on the air daily that are hooked up with Long Lines and how many

are on the air daily connected with Illinois Bell networks. I will get that information.

I should say that the same amount of that sort of service would be given by the Illinois Bell on a 16-hour continuing service that would be given by the Long Lines on a comparable service. Illinois Bell sales forces sell telephotographic service as another form of service that we offer. There is very little sold by either. Newspapers and picture companies employ that service. But there are no contracts for that service as it is on the basis of a toll message service. A high percentage of the full time telegraph service would have been sold by the Long Lines force.

Morse service is not used to any great extent by the Associated Companies. If it is a Morse service, it requires a rather expert man on Morse. We have them in our department but I doubt if Illinois Bell has, or a teletypewriter man in their department.

Illinois Bell, as to short period telegraph service, using the teletypewriter, would have the same to do with the sale of that service, as they would have in selling the full time service. I don't think they have men who devote their time to that exclusively. It is one of the several services their salesmen have to offer. The same activities with reference to sales apply to the sale of special contract telephone services both long time and short time.

Prior to 1930, the Illinois Bell received for making sales of Long Lines special services, their regular charges for the facilities involved, without any commission. But for about a year and a half or two years it has received a commission. I will supply that date when the commissions started. It was figured out on the same basis as the commission paid on toll. I think there was an interchange of letters covering the amount of the commission, which I will produce. No compensation was paid by Long Lines Department to the employes of the Illinois Bell for selling special contract services of Long Lines. As far as I [fol. 7774] know, these employes got their salaries from Illinois Bell.

With respect to the special sales campaign, the employes in the system have been asked to do all they could to promote the various services of the system—exchange, toll, special service and what not, so that any employe in any department at any place in the United States is informed

as to the several services we sell and they are in a position to intelligently discuss those services and close sales if the opportunity presents itself.

As far as I know, there are no special rewards for results in selling. The campaign has been running for probably two years. I think the campaign was originally suggested by several of the associated companies. I don't know to whom the suggestion was made, they just started it around and got some results. Several of the associated companies involved have been directing the campaign. I suppose the O. & E. department, A. T. & T. is used for advice and consulting purposes in connection with that activity, like they would be in connection with all other sales activities. By O. & E. I mean the operation and engineering department of the A. T. & T.

The Long Lines in connection with that campaign furnished certain information as to special and toll services; that is, generally how the services were being used, who had purchased them and how they were being made use of by the customers. The A. T. & T. division of Long Lines in Chicago participated in the campaign and were asked by the Illinois Bell people to help them sell their services like they were helping us sell our services. The campaign is a part only of the general selling work. It merely brings in more employes that we would nominally have selling the services and our force in Chicago continued selling special services as they had in the past. There was no special advertising in connection with the campaign, but amounted to merely a further number of people put on the job of selling service.

I am the one to give instructions in respect to selling of Long Lines service, message or special, but I gave no instructions in regard to this selling campaign.

When the Illinois Bell makes a sale of special contract services of the Long Lines, the Long Lines bills the cus- [fol. 7775] tomer and that is done continuously by Long Lines.

The Illinois Bell with respect to broadcasting operates the facilities in Chicago to see that they are working properly each day that the program is on the air. That is, the Illinois Bell maintains the instrumentalities, lines in the City of Chicago in connection with special contract services.

Mr. Charles Barnett is head of the Long Lines Division in Chicago and has been such I think about 12 or 15 years.

I don't know what the arrangement for compensation to the Illinois Bell was in respect to use of loops prior to 1930. There would be no special contract services of Long Lines in Chicago that does not use the plant of the Illinois Bell in Chicago to connect them up. Take a private wire between New York and Chicago. The customer would be sold by the Long Lines Department in New York. The service between New York and his office in Chicago and the private wire would be exclusively for the use of that customer, and a so-called loop would be used at both ends; that is, a loop in Chicago and one in New York. These loops are connected with the toll line or telegraph service between New York and Chicago. The same relates to all the different services—telegraph, telephone, full time and short time, also for the program. The telephoto is not on the special service; it is an individual message service.

Since I have been connected with the Long Lines, we have put in the short period teletypewriter service. Prior to my occupying the position of manager of commercial department, Long Lines, Mr. A. W. Drake had that position. For how long, I don't know.

I will look up and give you the information as to how many radio stations there are in Chicago area using circuits regularly. I will also give you an idea of the temporary radio service or one night stand. I know there are a great number of radio stations in Chicago and that at times some of them are put on for one night and some are on the air every night. I think there are some airports in Chicago that have special service but I would have to look that up. That is regular toll, also teletype on special contract circuits for dispatching planes and giving weather advice to pilots. I don't know the extent of any special service given to railroads at Chicago or of private wires [fol. 7776] leased to any electric power company or pipe lines or concerns of that sort. There are form contracts for the special services which I will furnish. There is one form covering permanent facilities and another form covering temporary facilities.

Defendants requested witness to furnish the revenues for the different services, including toll message for the years 1920, 1923, 1925, 1928, 1929 and 1930.

CLYDE UHRIG, for defendants.

Direct examination.

By Mr. Haight:

I reside on Manhattan Island, at 45 East 55th street. I am assistant comptroller A. T. & T. and have been for about 6 or 8 years; prior to that, I had similar duties with other titles for some years. That would take us back to 1920 or 1921.

I have before me an organization chart of the comptroller's department. (Marked Defendants' Deposition Exhibit 51, for identification.) According to that chart, I am assistant comptroller. The duties of the various divisions are broadly correctly described on that chart. My division, entitled "A. T. & T. Company, General Department of Accounts and Reports" comprises the work on the general books of the A. T. & T. general department, and also to the extent that we combine long lines balances at the end of each month and year, the books of A. T. & T. as a whole; both balance sheet accounts and revenue and expense accounts—all accounts.

The words "Special Studies in Respect of A. T. & T. Company's Accounting and Financial Matters" means largely a projection of our earnings and cash positions over 6 months to a year, in order to be in a position to advise the comptroller and others among other things of the needs for raising capital funds.

The title "Allotments to Associated Companies and Matters Relating to Acquisition of Associated Companies Securities," covers loans to associated companies usually for construction purposes and is evidenced by demand notes which we carry along and commonly exchange for [fol. 7777] common stock. Sometimes those notes and open account advances are repaid from the proceeds of bond issues of the Associated Companies.

The title "A. T. & T. Company, General Department Methods," relates to the best procedures in running an organization of 80 people which this comprises, accounting classifications, treatments and precedures, including financial, since we are very considerably involved in financial matters, loans, etc.

The "Supervisor of Methods" works with respect to

methods above mentioned. The auditor is in direct charge of the general conduct of the activities of the office.

"Supervisor of General Bookkeeping" has immediate charge of the books from which balance sheets and the income accounts are produced.

The title "General Books and Records, Real estate," relates to property in this block, 195 Broadway. However, to the extent that the work is done directly for the 195 Broadway Corporation, such costs are borne by that corporation.

The title "Tax and Commission Reports" covers the compilation of tax and commission reports, reports to the Interstate Commerce Commission, the New York Public Service Commission and various State Tax Commissions.

The "Supervisor of Disbursements" covers 100% of the disbursements of the general department, such as payrolls and disbursements under voucher authorizations.

The title "Special Assignments" covers rate case exhibits such as we have had recently at Columbus, Detroit, Chicago and so on and any other rush work which requires an exceptionally competent person. There is just one employe in that particular.

In the section "Supervisor of General Bookkeeping," there are about 30 people. They run not only the general ledgers but they draw off from those ledgers a great many reports and other data required from the books. For example, all these exhibits that Mr. Heiss has put in, come almost wholly from those books.

Under "Methods and Special Assignments" are routine bookkeeping and reporting.

"Special reports, assignments, internal audits and allot-
[fol. 7778] ments" refers to cash estimates, earnings estimates, allotment forecasts.

"General books and records" covers the actual posting to the general books and the subsidiaries.

"Employes' Stock Plans for Purchase of Stock of A. T. & T. Records and Reports" is the American Company's control of the stock plan in the various units of the Bell System as it converges up to the American Company.

"Files" refers to the filing, etc.

"Control Records and Reports" covers employes' stock plan, employes' savings plan by deductions from salary and the employes' life insurance plan; also by deductions from salary for A. T. & T.'s own employes as distinguished from System employes away from 195 Broadway.

"Payrolls and Deductions" relates to payrolls of the General Department covering 2500 odd employes.

"Vouchers" relates to payments other than payrolls to various creditors, all creditors other than employe payroll people.

"A. T. & T. Company General Department Accounts and Reports" relate to A. T. & T. Company only as distinguished from Bell System.

"Special Studies in Respect of A. T. & T. Company Accounting and Financial Matters" relates to business of A. T. & T. and very particularly its business in relation to its associated and affiliated companies. At the present time that would consist of the earnings estimate for the year 1932, what our forecasts for earnings for the coming year are,—forecast of our cash position at the end of each month through 1932. All income of whatever nature enters into such an estimate. It relates to income to be derived from Western Electric and indirectly from E. R. P. I. but we have no financial contacts with E. R. P. I. Any money represented by earnings coming to us from any source, which earnings we were entitled to, would enter into such an estimate.

Referring again to "Assistant Comptroller" and "Allotments to Associated Companies in Matters Relating to Acquisition of Associated Companies Securities," I would say that purchase of stock of an associated company by A. T. & T. technically would not be classed by us as an allot-[fol. 7779] ment in that we get a special vote to acquire this new stock and allotments which consist of the lending being covered by a special vote, the two will overlap, if you class the last which you mentioned as an allotment. That will probably be regarded as a straight purchase of stock under a special vote of the Executive Committee or Board of Directors, and would not technically be called an allotment, although the proceeds of each of those capital operations go for construction.

My division issues a great many of what we call C. R. reports which are the general run of financial statements, balance sheet of the company, earnings report, expense reports, broken down by departments.

The allotment of funds for particular purposes is determined by the associated companies. They send in at the beginning of each year, or rather at the last of each year, their forecast of their need of cash requirements for the

subsequent year. Whether those forecasts come to the comptroller or the head of the O. & E. department, or both I cannot say. They never come to me. The vote from the executive committee of the board of directors authorizing loans during the year up to a certain maximum for each company, comes to me. Until I get that vote, nothing is known in my department where any of the funds on hand are to be allocated. When the report of action by the executive committee of the board of directors or by the board of directors itself, comes to me to allot or to send to one of the associated companies certain funds, I don't know at that time how much is to be used to wash demand notes or how much is to be used towards the purchase of stock where no demand notes exist in the associated companies. However, in practice it is very rare to buy stock outright where no debt exists because that would place the associated companies in possession of surplus funds which they could not use.

When it is determined that the American Company will acquire common stock of an associated company and such associated company owes the American Company money on demand notes or open account, the American Company will originate a voucher under which a check is drawn, to buy common stock of the associated company, and the associated [fol. 7780] company, in turn, originates a voucher to use the proceeds of the sale of the common stock to pay off the notes.

We would not advance money unless we received either such a form of evidence of indebtedness or other authorized security that warranted us in our opinion to make the advance. If we purchased stock, the advance would not be classed as an allotment. Anything coming under the allotment vote of the executive committee is a loan, or an advance by way of indebtedness of the associated company to us. That would be handled through the comptroller's department, but it would not be put under the classification by allotment. My division would originate a voucher supported by a specific vote of the executive committee, if it tied into an allotment authorizing the purchase of the stock, which purchase would be approved in its legal aspects by our general counsel.

Money employed to purchase the capital stock of the associated company would come from corporate funds, but not separately kept.

The allotment vote specifies that the money would go out as loans either evidenced by demand notes or possibly carried along as an open account indebtedness. The capital stock purchases where no debt exists are not classed as coming under the allotment vote. Any other class of security that we roughly refer to as open account loan is distinguished from demand notes.

I have here a set of blanks. I recognize the first one, p. 2, of CR-1, CR-1a; CR-2 has been dropped. I recognize CR-3—balance sheet, and CR-3a. Several of these CR reports are not made up in my office but the CR series that include eight are made up in our office. CR-9 is made up in the office of the treasurer. These blanks are all comptroller's reports. These reports have various distributions among the executives. The first report CR-1 goes to the executive committee. About 90% of these reports are made up under my direction. The reports are as follows, the numbers and titles being given:

CR-1; title "Cash, Temporary Investments, Capital Stock and Convertible Bonds."

CR-1A; "Average Bank Balances for 30 days preceding——," the date to be typed in there, "With Per Cent of [fol. 7781] Total Average."

CR-3; "Balance Sheet, General Department."

CR-3A; "Bonds and Notes of, and Advances to, Associated and Other Companies."

CR-3B; "Loans Payable and Endorsed Notes."

3C; "Balance Sheet, General and Long Lines Departments Combined."

CR-4; "Earnings and Expenses for" to be followed by the period, the date.

CR-5; there is no title printed in it——

Q. 81. What is the general subject-matter, just a broad description of it will do.

A. It is stocks owned, principally.

Q. 82. Stocks owned by A. T. & T.?

A. Yes, there is a title "Investment in Associated and Other Bell System Companies."

CR-6; "Summary of Service Rolls as of" and then the date "With Changes Therein From" and then the date.

CR-7; "Estimate of Earnings and Expenses for —— —— —— Ending" and then in brackets below that "Quarterly Estimate for Dividends."

CR-8; "Estimate of Earnings and Expenses for — months ending —— — ——."

CR-9 and CR-10 were not prepared by my division.

CR-12; "Dividend Revenues for the Year Ending —— —, ——."

CR-13; "Total Advances Authorized for—and Payments thereunder for Year Ending —— —, ——."

CR-14; "Cash Statement for Month Ending"—2 sheets, and a 3rd, with the same CR number but another subject-matter; "Bank Balances."

CR-14A; "Average Return on Bank Balances and Temporary Investments."

CR-15; "Preliminary Cash Estimate."

CR-15A; 'Outline of Estimated Cash Allotments, Preliminary Cash Estimate."

CR-16; "Final Cash Estimate."

CR-16A; "Outline of Estimated Cash Allotments, Final Cash Estimate."

CR-17; "Comparison of Estimated with Actual Cash Transactions." One of those is by companies and the other [fol. 7782] by classes; there are two forms of 17.

CR-18; "Ways and Means Statement, Year —— —, ——."

CR-22; "Securities Pledged with Old Colony Trust Company."

CR-23; "General Department Expense Report for Month of —."

CR-24; "Summary of Departmental and Other Expenses."

CR-25; "Department of General Administration—Administration."

CR-27; "General Administration—Vice-President Wilson." "General Administration—General Service Bureau."

CR-29; "Department of Development and Research."

CR-30; "Department of Operation—Operation and Engineering."

CR-31; "Department of Operation—Personnel Relations."

CR-32; "Department of Operation—Benefit and Medical."

CR-33; "Department of Operation—Vice-President Cooper."

CR-34; "Comptroller's Department."
CR-35; "Treasury Department."
CR-36; "Secretary's Department."
CR-37; "Legal Department."
CR-38; "Information Department."
CR-40; "Bell Telephone Securities Company, Balance Sheet."
CR-41; "Bell Telephone Securities Income Statement."
CR-42; "Bell Telephone Securities—Analysis of Revenues and Expenses."
CR-43; "Bell Telephone Securities—Securities Owned."
CR-44; "Bell Telephone Securities—Expense Report."
CR-45; "Bell Telephone Securities—Cash Statement."
CR-46; "Bell Telephone Securities—Income Statement for— Months ending —."
CR.48; "Report of Cash Purchase Agreements for Shares of A. T. & T. Company Stock to Bell Securities Company."
CR-49; "Report on Installment Purchase Agreements for Shares of A. T. & T. Company stock to Bell Securities Company," and this CR-49 continues to deal with the foregoing report.
CR-49A; "Report on Installment Purchase Agreements for Shares of A. T. & T. Company stock to Bell Telephone [fol. 7783] Securities Company." That is a continuation. CR-49A continued "Summary of Cancellations of A. T. & T. stock under Bell Securities Purchase Plan."

CR-9 and CR-10 are not made out in my division. The treasurer makes out CR-9 and I think Mr. Saxton, another assistant comptroller, or the treasurer, probably Mr. Saxton, makes out CR-10. There are some forms which have been in existence once and become obsolete. There other reports in the comptroller's department, but these given concern my own division.

The sources upon which the different CR reports are made, which I have mentioned, are the general ledgers or the subsidiary ledgers in the comptroller's department, except, of course, the cash book, and we take the treasurer's cash book and post it into our ledger.

We do not receive monthly reports from the various licensees, the associated companies, with possibly only one exception. Mr. Saxton, assistant comptroller, receives those.

CR-14, 1st and 2nd sheets, are forms for monthly report with respect to the subject-matter stated at the tops. They would give the total statement for the year to the extent that they purport to give it by these various classifications of receipts and disbursements.

The December statement for the year would show facts as to each of those particular items for the entire year. (The reports on the 1st and 2nd sheets of CR-14 for the years 1919, 1920 and 1921 requested by defendants; also, reports on form CR-16 and CR-18 for years 1919 to 1930, both inclusive, requested by defendants.)

We do not use the word "budget" in the general department in connection with our expenses, but we estimate our expenses for the forthcoming year, and they are submitted to the president.

My division at the present is running an annual expenditure of approximately $275,000, with 80 people. As compared with 1923, the curve is up but I could not plot it for you.

I don't know of any forms of reports that used to be used and that are no longer used. I am quite sure my records would show that, if there have been any in existence corresponding to the missing numbers. I will check that and in-[fol. 7784] form you.

I am not directly concerned in the make-up of the allotment. I simply act on the amounts as voted by the committee as the maximum to loan. If, for instance, the Illinois Bell owe the American Company $10,000,000 at the beginning of the year, that would not enter into the amount of the allotment vote. The new allotment voted would be over and above the indebtedness at the beginning of the year.

(Cross-examination of Mr. Uhrig reserved by Mr. Blackman until later.)

PIERRE W. SAXTON, for defendants.

Direct examination.

By Mr. Haight:

I reside at 87 Summit Avenue, Bronxville, New York; I am an assistant comptroller of A. T. & T., and have been such since 1922. Prior to that I was in the Long Lines De-

partment for a time as auditor of the Long Lines, from 1910 on.

I am familiar with the organization chart which has been identified here as Defendants' Deposition Exhibit 51. I am the P. W. Saxton appearing thereon. My division receives the current reports of the associated companies, Long Lines, and the General Department, and combines them into Bell System reports. They also receive the provisional estimates and make a similar consolidated estimate for the Bell System.

The current reports received from the associated companies cover data from the books of the company. The same is true with respect to Long Lines. The provisional estimates are prepared annually by the associated companies and the Long Lines as to their requirements for the ensuing year,—the construction which they will undertake and revenues and expenses which they expect. As a part of the provisional estimates, we receive information as to the probable cash requirements of the various companies and Long Lines during the ensuing year. At the present time they cover a period of three years. Not all detail is given for the later years. That practice has existed for about three years. Prior to that time the period was five [fol. 7785] years, and that practice went back as far as my service with the company.

"Bell System Reports" bring together the figures reported by the various associated companies, Long Lines and general department into Bell System figures, and they are distributed to the various heads of departments and the various members of the staff organization; very few to Western Electric, perhaps two or three. There is a report as to station gain or loss which is furnished to, I believe, the president of the Western Electric, who also receives one or two of the over-all general Bell System Reports. The reason for furnishing them to Western Electric is that they ask for them. I believe the Western Electric people do get with the provisional estimate an estimate of material requirements that is summarized. The Western Electric is therefore furnished the statements which advises them as to the equipment requirements of the associated companies and of Long Lines. I don't think any of these reports go to the Long Lines.

I don't think I prepared any reports as assistant comp-

troller that go to the comptroller except in relation to the matters that I have already identified.

I am familiar in a general way with the reports made by the comptroller's department. I think the numbers run into the 90's. I have to do with making reports on those different forms. I have something to do with the report CR-10 in that it is prepared under my direction. I don't have anything to do with CR-9. I have a number of forms of reports which, generally speaking, are either consolidated reports of the Bell System Companies or reports showing comparative figures as between the various companies.

I have to do with the making up of reports in the following forms:

CR-51; Condensed Summary of Reports for—.

CR-51a; Condensed Summary of Reports for — excludes A. T. & T. Company Long Lines Department.

CR-51b; Associated Operating Companies Per Cent Balance Net Profits after preferred dividend to average common stock.

CR-51c; Bell Telephone System in United States, Earnings and Expenses.

CR-52; Associated Operating Companies, excluding A. T. [fol. 7786] & T. Company, Long Lines, Distribution of Total Net Earnings for Month of —.

CR-53; A. T. & T. Company Earnings on Capital Stock.

CR-53a; Bell Telephone System in U. S.

That refers to the interest of A. T. & T. Company in the assets of the Bell System and the value per share of A. T. & T. Company stock.

CR-54; Bell Operating Companies Comparison of Results for — Months of this year with same period last year.

CR-54a; Comparison of Results for — Months This Year for Same Period Last Year.

CR-55; Bell Operating Companies Present View for — Months as of — Compared with Actual Results.

CR-55a; Bell Operating Company's Present View for — Months as of — Compared with Actual Results for —.

CR-60; Bell Telephone System in United States, Balance Sheet — Date.

CR-61; Income Statement for Month of —.

CR-62; Telephone Operating Revenues Report for Month of —.

CR-63; Telephone Operating Expense Report for Month of —.

CR-64; Plant General Equipment and Intangible Capital Report for — Months ending —.

CR-65; Report of Station Circuits and Central Offices for Month of —.

CR-65a; Net Gain in Company Stations.

CR-65b; Report of Plant Mileage and Other Data for — Months Ending —.

CR-66; Plant and General Equipment Added, Removed or Abandoned for — Months Ending —.

CR-67; Comparison of Actual Results with — View for Months of — to —.

This report shows a comparison of the actual results of operation with the latest previous view.

CR-67a; Review of Provisional Estimate as of — Date (there are 3 sheets under that title).

CR-67b; Present View of Next Year —.

CR-71; Report on Reserves for Accrued Depreciation and for Amortization of Intangible Capital for Period Ending —.

[fol. 7787] CR-72; Report of Certain Clearing Accounts for Month of — (2 sheets).

CR-76; Statistical Units for — Months Ending —

CR-86; Unit Expenses for — Months Ending —

CR-87; Employes and Benefit Payments for Month of — (3 sheets).

CR-89; Report of Payroll Changes for Month of —

CR-90; Funded Debt — Date Bond Maturities by Years.

Those refer to A. T. & T. Company bond maturities. The entire system.

CR-91; Results of Operations by States, Annual Basis. Revenues and Expense for Average Company Stations and Percentages (2 sheets).

CR-92; Commercial Department Expense Report for Month of —

CR-94; Current Maintenance Expense Report for Month of —

CR-95; Supply Turn-Over and Gross Supply Investment per Average Company Station for Quarter Ending —

CR-96; Analysis of Charges and Credits to Account 264,

General Stable and Garage Equipment and Account 702 Stable and Garage Expense Year of —

CR-97; Statement Showing General Statistical Data for the Bell System Including Construction Items, Revenues and Expenses, etc.

Those were prepared by me or in my division under my direction.

CR-88, entitled "A. T. & T. Company Employes Stock Plan Participation by Employes of the Bell System" is prepared by Mr. Uhrig.

I will check over and see what forms, if any, were used previously that are not here and are not now used—as far back as 1923.

CR-52, entitled "Associated Operating Companies, excludes A. T. & T. Company, Long Lines, Distribution of Total Net Earnings for Month of —, 1931." relates to the various operating companies of the Bell System, excluding Long Lines, and it is made up from reports of the various companies concerned, which reports are still in existence [fol. 7788] covering many years.

I cannot say to whom CR-52 goes, but my division has a distribution list which shows where all the reports go. I think there is one also for the Comptroller's Department generally and one for each of the divisions.

Chart entitled "Distribution of July 1931, Bell Telephone System Comptroller's Report," is the distribution chart for my division, except as to CR-88, which is not prepared in my division. (Chart marked Defendants' Deposition Exhibit 52 for identification.) According to the distribution chart, various persons are to get different reports as indicated, such as directors of A. T. & T., executive committee of A. T. & T., C. P. Cooper, Vice President A. T. & T. W. S. Gifford, President A. T. & T. Mr. Cooper has charge of the accounting and finance. C. A. Heiss, Comptroller A. T. & T.; B. Hamilton, Accountant in my division; J. F. Behan, Assistant to Comptroller A. T. & T.; H. Blair Smith, Treasurer A. T. & T.; T. H. Brown, Jr., in Treasurer's Office A. T. & T.; E. J. Clark, Assistant Treasurer A. T. & T.; C. Uhrig, Assistant Comptroller A. T. & T.; J. W. Green, Auditor A. T. & T.; J. A. Nixon, Assistant Comptroller Uhrig's division; E. V. Cox, Vice President in Cooper's organization; S. L. Andrew, Chief Statistician, A. T. & T.; D. R. Belcher, Assistant Chief Statistician, A. T. & T.; P. W. Saxton, Assistant Comptroller A. T. & T.;

H. J. Brandt, Benefit and Medical Department A. T. & T.; Bancroft Gherardi, Vice President A. T. & T., O. & E. Department; R. H. Bureher, O. & E. Department A. T. & T.; E. S. Wilson, Vice President A. T. & T.; K. S. McHugh, O. & E., A. T. & T.; W. H. Harrison, O. & E., A. T. & T.; E. S. Bloom, President Western Electric; E. F. Carter, Vice President A. T. & T.; W. J. O'Connor, Assistant to President, A. T. & T.; H. L. Wlodeck, in assistant comptroller Behan's department; R. B. Shaver, Assistant Comptroller, A. T. & T.; G. B. Proud, Western Electric; R. E. Cowley, Western Electric; M. B. French, O. & E. of A. T. & T.; H. A. Trax, general auditor New Jersey Bell Telephone Company; H. C. Gretz, General Auditor Ches. & Pot. group of Telephone Companies; G. J. Brett, General Auditor, Michigan Bell Tel. Co.; R. P. Baird, General Auditor Northwestern Telephone Company; N. R. Powley, Vice President Pac. Tel & Tel. Co.; F. N. Rush, Vice President Pac. Tel. & [fol. 7789] Tel.; all presidents of the Associated Companies; W. J. Stout, Assistant Treasurer A. T. & T.; A. H. Richardson, in Chief Statistician's Division A. T. & T.; W. A. Mason, R. F. Wolff—I don't remember their titles; J. A. Griffin, in Assistant Comptroller Behan's division; Z. Z. Hughes, O. & E.; I don't know E. S. Wilson's department nor E. F. Carter's, but I will look that up and let you know.

The distribution chart I have been examining is the current chart and I think that running over the years there was a similar distribution chart.

G. B. Proud is assistant comptroller Western Electric; I don't know Mr. Cowley's position in the Western Electric.

With respect to CR-52, there is certain information under the titles "Net Telephone Earnings" and "This Month, Increased over last Month, Months this Year, Increase over same Period Last Year," given, which information is furnished by the various associated companies. The same source exists as to "Total Net Earnings," in that all the data contained in CR-52 is obtained from Associated Companies Reports. Net telephone earnings to average plant in service during 1931 and same period last year comes from the same source.

In compiling the figures under the title "Average Plant in Service during 1931" and the same period previous years, there is not included construction work in progress. The purpose of the report is to show a comparative state-

ment by companies of the various items and they are all on a comparable basis.

Respecting report CR-53 the source of the information given under the head "Dividends from Associated Operating Companies" are reports of the general department as to earnings, Mr. Uhrig's division. The source of the information on the undivided profits is the report of the operating companies. "Interest from Associated Operating Companies" is obtained from our own report; "Licensee Revenue" is obtained from Mr. Uhrig's report; "Long Lines Net" from reports of Long Lines; "Dividends of the Bell Telephone Company of Canada and Western Electric Company, Inc."—reports made up by Mr. Uhrig. "Other Revenue"—Mr. Uhrig's report. "Other Revenue" means mis- [fol. 7790] cellaneous items other than those mentioned.

There is another statement "Assuming that the expenses of the American Company, General Department, are paid from licensee revenue, the 9% dividend is derived from the following source," which latter statement refers to the 9% dividend of the A. T. & T. upon its stock.

The item "From Other Revenue" is a small item and is the same sort that appears above.

At the bottom there is another legend "Associated Operating Companies (excludes A. T. & T. Co. Long Lines Department)" and under that there is a further legend "Comparison Net Telephone Earnings to Average Plant in Service" and underneath that there is another legend "Balance, Net Profits after Preferred Dividends to Average Common Stock." I cannot say whether those items have been kept during the full time I have been in my division. I don't know how far back they go.

BANCROFT GHERARDI, for defendants.

Direct examination.

By Mr. Haight:

I reside at Short Hills, New Jersey; I am Vice President and Chief Engineer of the A. T. & T. and have been connected with A. T. & T. since 1907; prior to that I went to the Polytechnic Institute at Brooklyn and graduated scientific course 1891, degree of B. S.; I then went to Cornell and took an electrical engineering course, graduating in 1893. I went back there for postgraduate work and received Master's degree in 1894; I then went to work with the New York

Telephone Company, then Metropolitan T. & T. Co. in February 1895 and continued with that company until 1900 or 1901, when I went to Brooklyn as chief engineer of the New York & New Jersey Tel. Co., now part of the N. Y. Tel. Co.; it operated all of Long Island and all of New Jersey; I was there until March 1906; at that time the operating organization of the New York Tel. Co. and of the New York and New Jersey Tel. Co. were consolidated, and I became chief engineer of both companies, which position I held until 1907, when I went with the A. T. & T.

[fol. 7791] I have been Chief Engineer, my present position, from 1919 and became Vice President in 1920 or first part of 1921; from 1907 until 1919 I had no definite title until April 1909, after which time my title became Engineer of Plant.

Defendants' Deposition Exhibit 53 for identification, consisting of 7 sheets, is the organization diagram chart, Engineering Department of Department of Operation and Engineering of the A. T. & T. The Engineering Department of the A. T. & T. does not itself operate anything. It advises and suggests to the Associated Companies and the Long Lines in the operation and engineering work which they do. The department has nothing to do with the purchase of operating properties. It advises as to the types of equipment, of apparatus and arrangements which can be most effectively used to meet various conditions in connection with operation.

There is uniformity in telephone equipment maintained throughout the Bell System. That is brought about through the fact that there is a common agency through which such equipment is designed and developed and through the fact that there are recommendations made as to the methods in which the equipment shall be used. The agencies concerned are the O. & E. Department, Dev. and Research Bell Tel. Lab. and the Western Electric. The O. & E. Department through its constant touch and advice which it gives to the Associated Companies, obtains familiarity with conditions existing in the Associated Companies and the Long Lines, and is in a position to and does advise the Department of Dev. & Research as to the needs of the operating system or as to the troubles which may exist with regard to the existing methods and devices.

The O. & E. Department does practically no invention work. Occasionally, but very rarely, in its efforts to im-

prove or to standardize or to solve problems or meet new conditions, it evolves inventions. The O. & E. Department generally works out what might be called the operating methods. It is then the duty of Dev. & Research or Bell Lab., or the two working together, to develop the necessary instrumentalities. If the methods need new instrumentalities, then it is their object to develop those. The Western Electric of course manufactures the equipment and has a part in dealing with the laboratory to discuss with the lab- [fol. 7792] oratory the practicability of anything which the laboratory may propose for use. Very seldom, however, does the O. & E. Department in connection with its general work in the system, advice Western Electric. The O. & E. Department's principal direct connection with Western Electric is when the Associated Companies need anything which, for any reason, may be difficult to get at the time the Associated Companies want it, or the Long Lines want it, to help the Associated Companies get it.

There is no place where the final authority on questions of standardizations reside. There are places where the responsibility for recommending standards arises, but that authority does not carry with it the power to enforce the use of those standards. The O. & E. Department determines standardization for the apparatus, circuits and systems and also operating methods which applies to both the Long Lines and Associated Companies. The O. & E. Department advises the Associated Companies as to the best and most effective methods of making fundamental plans. It discusses with them the matter of difficult questions that come up in the making of those plans and consults with them as to the results of the plans if the Associated Companies desire such consultation.

Naturally all fundamental plans must assume some switching methods, some types of equipment to be used, because all a fundamental plan is, is a method to estimate from 15 to 20 years ahead what your arrangements will be to take care of the business. Some basis of taking care of the business as to operating methods and as to type of equipment must underlie a fundamental plan. And naturally the only practical basis upon which a fundamental plan can be made is to use the then best known methods and equipments as the basis of the plan.

The needs of long distance service of immediate character and future needs practically have no effect in the de-

velopment of a local fundamental plan. There is no especial necessity for conforming the equipment in a local fundamental plan to serve in long distance service. A local plan as such can be developed in utter disregard of any long distance service requirements. However, the long distance service requirements are necessarily considered in what is [fol. 7793] known as the toll fundamental plan. The toll fundamental plan does not concern itself with local equipment.

There is no definite relationship or necessity for relating toll fundamental plans with local fundamental plans, except for one thing,—they naturally ought to be consistent as to magnitudes; and at the moment I do not think of any necessity for any relationship between local fundamental plan and the toll fundamental plan in respect to equipment. The relationship on account of magnitude comes about in this way. If you are making a plan for any given place for 20 years from now, you have to allow for the estimated growth in that place in that period. While they are not the same there is some relationship between the growth of the local business and the growth of the toll business to be expected in 20 years. If the plans are made for the same period there should be that general consistency in their magnitude.

When I speak of toll business, I am referring to both that of the Long Lines and that of the local company. The O. & E. Department has assisted and cooperated with Illinois Bell, in the making of fundamental plans. That assistance and cooperation has been, of course, of the same general character as assistance and cooperation with reference to fundamental plans of other companies, but every fundamental plan differs as to local conditions. In many cases the O. & E. Department reviews the fundamental plan after it is completed by the Associated Company and makes suggestions, recommendations or criticisms that might occur, if it is thought that the plan is not the most effective one that could be devised.

Of course, the benefit of our experience on all preceding fundamental plans is brought to bear on the Illinois Bell plans if we assist on them and others and that experience which we got there is added to our previous experience in regard to all subsequent plans.

There is a relationship between the fundamental plans of the different companies one with the other, in that they

are all handling telephone business. Telephone business has certain similarities even in different places. There are different conditions in every place. There are some general conditions of similarity so there is that relationship to be found between the plans. These plans are dealing with, [fol. 7794] generally speaking, similar problems in different places and where conditions vary. On the other hand, the result of a fundamental plan in one place does not affect the fundamental plans in another place unless the places are adjacent to each other, so that they are in effect parts of the same local community.

I don't know of anything that can be characterized as a program or fundamental plan in existence that relates to the entire country, as far as the Bell System is concerned. Perhaps a very large number of plans taken together might be so considered. The objective of the number of plans taken together would be to take care of the telephone business of the country today and tomorrow.

As to whether as an engineering proposition there is any necessity for coordinating these associated companies or the fundamental plans, I would say that if engineering is to be considered as doing things in the best way from the physical standpoint, I would say there was, the general reason being that engineering wants to do things in the best way and to the extent that the conditions and the general problems that they are dealing with is the same. There is a general similarity between what constitutes the best and that constitutes a tie between them.

In the event that a Chicago fundamental plan called for a grounded circuit with iron wires, I would say that if such a thing were called for by the dictates of good engineering, the thing to do would be to provide the necessary arrangements in order that they could be used. I could not, however, conceive of conditions under which I would approve of such a plan in the City of Chicago under the present state of the art, the reason being that there are very serious objections to grounded circuits, particularly where they have to be operated in cables, and pretty nearly all the Chicago telephone plant is in cables. Condensed, the reason is that one could not give good telephone service over grounded circuit in Chicago. I would not, however, take into consideration any requirements of long distance service in that connection. I would say, broadly speaking, that if the local plant is built so that it will take care of the local

conditions, the requirements of the local plant have been satisfied, from an engineering standpoint.

[fol. 7795] The assumption that "if the local plant is developed to any extent to care for long distance connections from the standpoint of local service, that would be an unnecessary development" is contrary to the fact. I think it is a correct assumption that there is no relation to the development of local plants and long distance plants, except as it relates to magnitude, although of course there is a relationship arising from this fact that it is an advantage to the local plant in its own development that it shall be able to give the most extensive service possible.

If at each local plant you succeed in giving satisfactory local service, then as far as the local plant is concerned the conditions are satisfied to enable a nation-wide service to be given so that a person in any part of the country can talk to any other person in the country without limitations of distance or property ownership. No coordination is necessary, except in the sense that coordination may mean having adequate standards of local service. In that latter sense coordination is necessary.

During the time that I have been doing telephone engineering there have been improvements in construction methods that have had an effect upon the construction of telephone plants in a city like Chicago. Such improvements are underground cables, switchboards, design and the arrangement of buildings, conduits, substation equipment. There have been improvements in tools and improvements in the methods of doing the work and improvements in the organization by which the work is directed, which relate to actual construction work. Improvement in tools are tools used for adjusting the various types of apparatus; tools which installation and construction people use in the doing of the work. There have been improvements in the instrumentalities such as motor vehicles and things like that, used in transporting people and materials to the job. Tools for adjustment are very numerous. I would have to refresh my recollection before answering that in detail. As an illustration, I will refer to the tools which we use for properly adjusting the subscriber's bell at subscriber's station in order that the instrument may always be in the very best condition for use.

Another outstanding one is the tools for the adjustment of [fol. 7796] spring jacks in switchboards. In the constru-

tion of pole lines there have been improvements in motor vehicle equipment, including the providing of trench digging machinery and pole-placing machinery which is used in the construction work under telephonic conditions. This has resulted in making the construction of pole lines more economical. These economies are substantial. I would have to refresh my recollection, however, as to figures. The amount of the decrease in cost would vary to some extent in different parts of the country.

The method of construction of manholes, the arrangement devised for the construction of manholes, have diminished the cost of manhole construction. We do not develop switchboard installing methods, but I do know that improvements have been made, but I could not state just when.

About 1920, but I could not place the exact date, I think there were improvements in regard to avoiding the assembling of all the parts of the switchboard in the place where it was to be erected, saving cost of installation. The older method of assembling switchboards used to be to ship switchboards in the various parts and to do a very large amount of the assembling on the job. About 1920 I think it was, plans were modified so that a great deal could be done in the way of assembly work and adjusting work in the factory and parts were shipped in larger units, thus requiring less work in putting them together at the local exchange where they were being installed. I don't know how that has affected savings, but I could refresh my recollection on that.

When I speak of automobiles in connection with the installation of pole lines, I referred to that as well as other construction. I had in mind, for one thing, that automobiles in the local exchanges, equipped with all the necessary materials that are needed for the installation of stations and the installation of Private Branch Exchanges, require special designs of one kind or another and so material can be stored away in such ways that it can be immediately accessible and those designs have been prepared and arrangements like that have been made available to the associated companies. For the pole line construction there is, of course, the problem of transporting the pole, transporting [7797] the cable and digging the hole for the pole. For placing a cable especial automotive machinery has been

designed for that kind of work and is used by both the associated companies and the Long Lines.

Sometimes these improvements in tools for construction have cheapened construction costs and sometimes they have resulted in better construction and sometimes both. These improvements in construction would affect a good many of the different constituencies of telephone plant. Generally speaking, improvements in methods of work extend throughout the entire plant.

Taking the improvement movement in construction as a whole, that has been going on right along. It has been a continuous evolution for a good many years. At one time a particular thing may come to fruition, at another time another thing. Generally speaking, it has been a concerted movement and resulted in the development of better and cheaper tools with which to apply those methods. I should say since the war there has been relatively more accomplished.

With reference to organization, I perhaps can give you an illustration. There used to be a time when stations would be installed by having a couple of men go around there with the station equipment, the bell box and everything else that was necessary and put it in then and there. Methods have been developed and this is primarily an organization matter by which all of the various tools and equipment have been brought to the station and one man goes around there and installs it. Generally speaking, if you can do a lot of construction work in one operation, it is cheaper than if a little piece is done here and then another little piece and then another little piece, done at different times, assembling the material, arranging the organization and making the plans each in little bits.

Generally speaking, I am familiar with work done under the terms "specific estimates" and under "routine estimates." When a large job is done, it is done under a specific estimate. For example, if a new building is to be built, a new conduit is to be built, a new cable is to be laid, of reasonable magnitude, a specific estimate is prepared for that work. There are considerable quantities of such work [fol. 7798] such as the small work of installing and moving stations and installing and moving private branch exchanges and bits of other things which are going on all the time and where the individual jobs really have no special,—where no specific estimates can be prepared. It would cost more

prepare the specific estimate for installing a single station an it would to build the station, so a routine estimate is estimate prepared to cover a lot of small items of the me general character. You might prepare a routine estite to install 10,000 new stations or you might prepare routine estimate covering all the new stations to be inlled during the next three months. The usual practice is prepare routine estimates covering the estimated reirements for a given period of time rather than to cover a ven amount of work.

There have been improvements made with reference to e construction of conduits since 1914, such as trench digng machinery, machinery for breaking up pavements, for mping back over the trench after it is filled, things of that pe. There has been a good deal done along that line since e war. So far as that single factor is concerned, it has duced the cost of construction. Yet the trend of the other ings that go into those costs may be such that the final sts are larger than they were before. But so far as imovements in methods of installation and improved equipnt employed to install are concerned, they have cheaped the costs of construction or have done a better job. y department makes studies of provisional estimates of sociated Companies.

The provisional estimates reflect the expected operating sults of the companies during the succeeding year in conderable detail and then for a year or two after that in mewhat more bulk. We review the provisional estimates order to advise the operating companies and the Long nes and to comment to them on the basis of the operations ich they are proposing.

The Illinois Bell prepares the provisional estimates for icago. It is an organization work. The organization as whole of the Illinois Bell is pretty much involved in the eparation of provisional estimates. There is no one in r organization that has particular charge of Chicago.

d. 7799] There is a little work in our organization done connection with the expected plant operating results ich will come in the Plant Department from the proional estimate as submitted. We make use of the proional estimates sent to the A. T. & T. in that we study and advise the Associated Companies with respect to basis upon which they are planning their operations for ceeding year. The advice is for the purpose of arriv-

ing at the best and most economical basis to operate the companies and to give good service. There are variations in gang efficiencies. Where gangs use the same methods, sometimes the variations are due to extraordinary conditions. Some gangs may be working under more difficult conditions than other gangs and they may be working under worse weather conditions and there may be other conditions which are different. As gangs are made up of human beings, there are necessarily variations in the gangs themselves. Since the war, generally speaking, there has been improvement in gang efficiency. A number of things have brought that about, such as better organization for carrying on the work, more effective planning in the ordering of the work so that the gangs have less lost time, better methods and better tools; sometimes better apparatus and equipment that require less work.

In a general way it has been often possible to change the number of gangs to get more effective results when gangs are provided with new and different types of machinery. The general effect of that is to change the size of the gang. For instance, it takes a large gang to build a conduit if the trench is to be dug by hand. A smaller gang will suffice to build that same conduit if the trench is dug my machinery. The methods and sizes of gangs are often quite closely related. By improving gang efficiency, we have been able not only to do better work but we have been able to reduce construction costs, considering that factor isolated. Of course, many other factors go into construction costs but as far as that single factor is concerned, it is so.

(Right to cross-examine reserved until later.)

[fol. 7800] Pierre W. Saxton, recalled.

Further direct examination.

By Mr. Haight:

The official files referred to in the distribution chart are kept in my division, Room 2409 of this building.

Mr. Haight: I would like to have produced by the witness for each of the years 1919 to 1930, both inclusive, C. R. Reports 51, 51a, 51b, 52, 53, 53a, 54, 54a, 55, 55a, 65, 65a, 65b, 66, 67, 67a, 67b, 76, 86, 91, 92, 94, 97.

Mr. Blackman: Some of those reports mentioned the cour

sustained objections to recently. I can state definitely now that as to anything the Illinois Court ruled upon in accordance with our contention that you did not have the right to examine that, we will not have the witness produce now.

After 15 minutes' recess Mr. Blackman further stated:

I have examined our records and find that as to C. R. 51 and 51a, we have agreed to let you have them and we have sent for them and they will be here in a moment. As to the others I can find no record of any request for the other reports. Mr. Bracelen is ill today, and he may have a record of those requests.

Mr. Haight: Mr. Blackman has now produced what I understand to be the condensed summary reports C. R. 51 and 51a for the years 1919 to 1930, both inclusive.

Defendants offered C. R. Reports 51 and 51a in evidence, to which plaintiff objected on the ground that they were irrelevant, the exhibit number and the C. R. Report for the year corresponding, being indicated as follows:

C. R. Report 51—1919—Defendants' Deposition Exhibit 54.

C. R. Report 51—1920—Defendants' Deposition Exhibit 55.

C. R. Report 51—1921—Defendants' Deposition Exhibit 56.

C. R. Report 51—1922—Defendants' Deposition Exhibit 57.

C. R. Report 51—1923—Defendants' Deposition Exhibit 58.

C. R. Report 51—1924—Defendants' Deposition Exhibit 59.

C. R. Report 51—1925—Defendants' Deposition Exhibit 60.

C. R. Report 51—1926—Defendants' Deposition Exhibit 61.

C. R. Report 51—1927—Defendants' Deposition Exhibit 62.

C. R. Report 51—1928—Defendants' Deposition Exhibit 63.

C. R. Report 51—1929—Defendants' Deposition Exhibit 64.

C. R. Report 51—1930—Defendants' Deposition Exhibit 65.

[fol. 7801] C. R. Report 51A—1919—Defendants' Deposition Exhibit 66.

C. R. Report 51A—1920—Defendants' Deposition Exhibit 67.

C. R. Report 51A—1921—Defendants' Deposition Exhibit 68.

C. R. Report 51A—1922—Defendants' Deposition Exhibit 69.

C. R. Report 51A—1923—Defendants' Deposition Exhibit 70.

C. R. Report 51A—1924—Defendants' Deposition Exhibit 71.

C. R. Report 51A—1925—Defendants' Deposition Exhibit 72.

C. R. Report 51A—1926—Defendants' Deposition Exhibit 73.

C. R. Report 51A—1927—Defendants' Deposition Exhibit 74.

C. R. Report 51A—1928—Defendants' Deposition Exhibit 75.

C. R. Report 51A—1929—Defendants' Deposition Exhibit 76.

C. R. Report 51A—1930—Defendants' Deposition Exhibit 77.

On the back of C. R. 51 for the year 1922, there is a note to the item of undivided profits for the year shown on line 29 on the face of the report which states that the item "includes revenues held in reserve pending rate decision as follows":

Then is given the names of certain companies and the amounts opposite each. That information came from the report of the various companies. Below that there are two notes, the first one indicating that the figure of average capital obligations shown on line 33 on the face of the report includes the capital stock installments; the second note indicating that the item of average capital stock shown on line 34 on the face of the report excludes capital stock installments.

C. R.-52, C. R.-51 and C.R.-51A are made up from the same sources. Information contained on C. R.-52 is not used in making up reports C. R.-51 and C.R.-51A.

Referring to C. R.-52 there is the title "Distribution of Total Net Earnings for Month of —." I cannot say as to whether we have for the entire period that I have been in charge of my division, C. R.-52 Reports. How long I ha

been regularly engaged in making up this report,—I would have to refresh my recollection. Those reports are regularly distributed as indicated in Distribution Chart Defendants' Exhibit 52 for identification. The list of companies whose names appear in the left-hand column of C. R.-52 are the associated companies of the Bell System. These reports show the net telephone earnings for each of those companies and also the total net earnings with the exclusion of duplications. With the same qualification that duplications are [fol. 7802] excluded, the reports show the average plant in service during the time indicated upon each of the reports.

The information contained in C. R.-53 Reports is not used in making the C. R.-51 or C. R.-51A Reports. I think these reports C. R.-53 were used when I first took up my present position. The reports made up in my division are placed in an official file and are preserved. I will find out how long C. R.-52 and C. A.-53 have been used. C. R.-53 is not used in making up the other C. R. Reports. C. R.-53A has information called for by the form and for the various years indicated. I don't remember when we commenced using 53A but I will refresh my recollection.

C. R.-54 is not used in the compiling of Reports 51 or 51A. I will refresh my recollection as to how long C. R.-54 has been used. The same answer as to C. R.-54A as for C. R.-54. The same answer as to C. R.-67. The same as to 67A; 67B; C. R.-76; C. R.-86; C. R.-91; C. R.-97. The information in those reports is not used in company reports C. R.-51 and 51A.

I will check up and ascertain as to how the different reports have been changed, if any.

The same answer as to C. R.-94 and C. R.-97.

The general subject matter of the different reports has remained the same. I will check up on all that.

C. R.-52, C. R.-53 and C. R.-53A were first prepared in 1920; C. R.-54 was prepared since a date prior to 1919. Prior to 1931 the title to this report was "Comparison of Provisional Estimate and Actual Results (Excluding Purchases, Sales and Transfers) for — Months Ending —."

C. R.-54A first prepared in 1925; prior to 1931 the title to this report was "Comparison of Provisional Estimate and Actual Results (Excluding Purchases, Sales and Transfers) for — Months Ending —."

C. R.-67 was first prepared in 1927 in its present form. Prior to 1927 the report known as C. R.-67 was a consolidated Bell System payables report. Such a report is no longer in existence.

C. R.-67A was first prepared in 1928; C. R.-67B in 1931; C. R.-76 and C. R.-86 were prepared since dates prior to 1919. C. R.-91 was first prepared in 1920. C. R.-97 was first prepared in 1931.

[fol. 7803] The difference between C. R.-51 and C.R.-51A is that 51 is a consolidated report for the Bell Telephone System in the United States, including Associated Companies, Long Lines and A. T. & T. General Department. C. R.-51A is a report for the Associated Operating Companies excluding Long Lines and General Department. Only the United States is covered in those two reports, except that as to C. R.-51 it includes revenues in the form of dividends received from the Bell Telephone Company of Canada.

The source of the information contained in C. R.-51A are the reports received from Associated Companies, which reports come on standard forms. I believe that the information appearing upon 51A comes from the same form from each of the Associated Operating Companies and the information appears on a monthly report form. The report is prepared from more than one of the reports of the Associated Company. It is a summary of the reports from all the companies as indicated. Reports of the different companies are of the same character upon these forms.

Speaking for the moment of one of those companies, the information on C. R.-51A comes from a plurality of reports on forms.

C. R.-51A is the same as monthly report No. 1 for the individual company.

It is fair to say that C. R.-51A is a summary of monthly reports No. 1 from each of the several Associated Companies, with the qualification that duplications are excluded.

Referring to Blank Form C. R.-51A used in the year 1932, and line 42 thereof, there appears in parentheses the words "except Adv. and Dir.," which means "except Advertising and Directory."

Referring to line 37 of C. R.-51A for the year 1923 and the same line of C. R.-51 for the same year, it is my understanding that total telephone revenues to average plant in service there indicated, does not exclude the items in the parenthetical clause referred to in the form now in use.

The item on line 31 "Average Plant in Service" of C. R. Reports 51 and 51A for the year 1923, has had no deduction for depreciation reserve, but excludes construction work in progress.

The items in lines 1 to 5, inclusive, of C. R.-51 and 51A are [fol. 7804] taken from the books and are ledger values of the Associated Companies.

We do not use the monthly report No. 1 in summarization to get these figures appearing on C. R.-51 and C. R.-51A as these are condensed summaries. The various lines on this report consolidate several accounts in each case and in preparing our consolidated summary, we go back to what may be termed the original sources,—the other reports of the company, which reports are of revenue and of plant in general reports which give more detail than monthly report No. 1. The reports used in preparing C. R.-51 and C. R.-51A are monthly reports No. 2, balance sheet, monthly report No. 3, income statement for month of —; monthly report No. 4, telephone operating revenues report for month of —; monthly report No. 5, telephone operating expense for month of —; monthly report No. 7, on station circuits and central offices for month of —; monthly report No. 21, plant and general equipment added, removed or abandoned for — months in —; monthly report No. 23, report of operating changes for month.

In addition, certain items are obtained from monthly report No. 1, condensed summary of reports for — month. There are no additional reports used to compile C. R.-52.

As to C.R.-53, I am not quite sure whether additional reports are used.

As to C. R.-53A, I think we would need certain other information for that report which is obtained, I believe, from a report by Mr. Uhrig's division, and we would obtain from that report the per cent of interest of the American Company in the various Bell System Companies.

C. R.-54 and 54A can be compiled fom those reports I have mentioned. The information on C. R.-67 is obtained from monthly reports No. 22A of the Associated Companies, entitled "Comparison of Actual Results with — View for — Months of — to —," and that report is in the same form as C. R.-67.

The information contained on C. R.-67A is obtained from the monthly reports No. 22B of the Associated Companies,

entitled "Review of Provisional Estimates as of — date" and 22B is in the same form as 67A.

The data for C. R.-67B is obtained by summarizing Re- [fol. 7805] ports No. 22C of the Associated Companies, which is the same as 67B.

C. R.-76 and C. R.-86 are made up from the same monthly reports as used in the preparation of C. R.-51 and 51A. C. R.-91 deals with the results of operation by states. Therefore, for those companies operating only in one state, the information can be obtained from the same sources as are used in the preparation of C. R.-51 and 51A. When companies operate in more than one state the information is obtained from a report from the Associated Company, the number of which report I do not recall. C. R.-97 is a report for the Bell Telephone System in the United States and the figures are obtained from other C. R. Reports referred to.

The various reports identified as to sources have all been kept on file in the offices of A. T. & T.

Mr. Haight: I ask that the witness produce the various reports from the various Associated Companies for the years 1919-30, both inclusive, stated by the witness to have been used as the sources of information in preparing C. R.-51 and 51A for each of the years in question; also Reports 22A, 22B and 22C and special report for C. R.-91 covering the same period of years.

Mr. Blackman: I would like to consult Mr. Bracelen about that before answering. Of course it is the policy of this company as far as possible to furnish all necessary papers, but I might say here, if those documents are the ones from which you could get the information that we have already denied you, I would be disposed to deny them also, but we will advise you.

The Witness (continuing): Other divisions of the Comptroller's Department than my division, receive copies of some of the reports. Monthly Reports No. 1, 2, 3, 4, 5, 6, 7, 22a, 22b and 22c and special report for C. R.-91 are all received by my division, and in some cases more than one copy is received. I cannot say at the moment to whom the additional copies go. I think Mr. Morello in my division handles the distribution of them. I assume they come by mail, but I never checked that. It might be that the reports come to Mr. Heiss first, rather than to me. However, my division gets all the copies if there is a plurality of copies, and I think whatever distribution there is is made by my

division. I am quite sure there is a record kept of the distribution of these monthly reports of the Associated Com-
[fol. 7806] panies that come to my division. The record of that is kept in my department and under my direction.

Mr. Haight: I would like to know what that record shows and what the fact is. I am going to ask the witness either to do it or I am going to ask Mr. Blackman to let us call Mr. Morello. I just want to show the facts.

Mr. Blackman: Yes, well——

Mr. Haight: Either way is all right.

Mr. Blackman: So far as I am concerned, I will facilitate your raising the point——

Mr. Haight: Yes.

Mr. Blackman: In so far as that bears on those matters that we are not inclined to give you information about, why, I am inclined to stand on what I think are my rights.

Mr. Haight: All right, then I will ask——

Mr. Blackman: But in so far as raising the question is concerned I will assist you in any reasonable way and we will not——

Mr. Haight: Then I will ask Mr. Saxton to acquire the information as to the distribution of these reports coming from the associated companies to his division, not only their distribution within his department to other divisions, but distribution outside of that and then I will rest with Mr. Saxton.

My division does not keep any record of any securities sold to other than stockholders of A. T. & T. If there is anything of that sort, I should expect it to be in Mr. Uhrig's division.

I think we keep a file of the bond circulars but my division does not have anything to do with the keeping of records. Very unlikely there is a copy of the circular issued by J. P. Morgan & Co. concerning the bond issue of $100,000,000 20-year Sinking Fund 5½% Gold Bonds of November 1, 1923; the same answer as to 35-year Sinking Fund 5% Gold Debentures, $125,000,000 issue of January 1, 1925; and also as to $150,000,000 5% Gold Debentures of February 1, 1930.

My department does not keep any records of the development and research work classified according to kind of work and the cost thereof. I may receive personally a copy of the expense report of Development & Research as prepared by

Mr. Uhrig; nor does my division keep a record of the loans made to Western Electric by A. T. & T. That is kept by [fol. 7807] Mr. Uhrig; nor do I have anything to do with the income tax records. I cannot state what division handles that.

As to monthly report No. 2, we receive seven copies, with one additional for December. One goes to Mr. Heiss, one to Mr. Hamilton, Supervisor in my Division; one to Assistant Comptroller Behan; one to Chief Statistician Andrew; one to Vice-President Gherardi; one to Mr. Blair-Smith, Treasurer; one to the official file. The extra copy for December goes to Mr. Brown in the Treasurer's Office.

As to monthly report No. 3, the same number with an additional copy in December are received and the distribution list is the same.

As to monthly report No. 4, we receive eight copies with an additional for December. One to each of the following: Mr. Heiss, Hamilton, Behan, Andrew, Gherardi, McHugh in Mr. Gherardi's department; Mr. French of Mr. Gherardi's department and the additional copy for December to Mr. Brown.

I have a chart which I have prepared before me—Defendants' Exhibit 78, which is offered in evidence; shows the distribution of these various monthly reports coming to my division and is made by my division.

Mr. Cooper, whose name appears on the chart, is operating vice president; Mr. Wlodeck is in Mr. Behan's division; Mr. Uhrig, assistant comptroller; Messrs. Burcher and Harrison both of Mr. Gherardi's department; also the Benefit and Medical Department appears on the chart Vice-President E. F. Carter among other duties is in charge of personnel work. They are all connected with the A. T. & T. and its departments.

Forms of monthly reports were marked as exhibits as indicated below and offered in evidence, to which plaintiff objected on ground of relevancy, and as unduly encumbering the record:

Monthly Reports

1—Defendants' Deposition, Exhibit 79.

1A—Defendants' Deposition, Exhibit 80.

2—Balance sheet—Exhibit 81.

3—Income statement for month of ... —Exhibit 8

4—Telephone operating revenue report for month of . . . —Exhibit 83.

[fol. 7808] 5—Telephone operating expense report for month of . . . .—Exhibit 84.

7—Report of Stations, circuits and central offices for month of . . . .—Exhibit 85.

21—Plant and general equipment added, removed or abandoned for — months ending . . . .—Exhibit 86.

23—Sheets Nos. 1 and 2—Report of Payroll changes for month of . . . .—Exhibit 87.

22A—Comparison of actual results for . . . .—Exhibit 88.

22B—Sheet 1—Review of provisional estimate as of . . . .—Exhibit 89.

Sheet 2—Monthly distribution of present view for period . . . . to . . . .—Exhibit 89.

22C—Present view of next year—Exhibit 90.

Analysis No. 10, entitled "Statistics showing the Results of Operations of Telephone Property for . . . . ending . . . ." —Exhibit 91.

Mr. Blackman stated his objection heretofore made was intended to apply to each of the above exhibits separately and to all of them.

Mr. Haight: Yesterday on the record, we made request of Mr. Saxton that he produce the monthly reports of the various associated companies for each of the years 1919 to 1930, both inclusive. I repeat that request and make the request in addition that there be furnished us for the years 1919 to 1922, both inclusive, and from 1923 to 1930, both inclusive, and I also make the request specifically for each of the years 1919 to 1930, both inclusive, and yesterday Mr. Blackman was to say what instructions would be given to the witness in that regard and I would like to know the answer now.

Mr. Blackman: The answer is that we will not furnish those reports of the companies other than the Illinois Bell.

Mr. Haight: Then may we have those for the Illinois Bell?

Mr. Blackman: Oh, I do not know; I suppose we could get those in a few minutes but you have had those already, I think.

Mr. Goldstein: What they did was, they said we could find all the Illinois Bell's in the offices of the Illinois Bell but they have not been identified so that we could look specifically over them.

[fol. 7809] Mr. Blackman: Well, if you want the Illinois Bell reports here for the purpose of convenience, why, we will get them. Do you want the witness to get them right now?

Mr. Haight: No. Then it may be understood that at some convenient time today, or if we are here tomorrow, those will be produced and we will identify them then.

Mr. Blackman: Surely.

Mr. Haight: As to the rest of the request that we have put in three different forms so as to cover the periods, as you have observed, with respect to those, as I understand it, the witness is instructed not to produce them.

Mr. Blackman: Yes, the witness will produce those under proper subpoena issued by the court and we will, of course, do all we can to attack and vacate the subpoena because we feel you have no right to those documents.

Mr. Haight: Now, off the record.

(Discussion.)

Mr. Haight: Now, Mr. Saxton, I wish you would tell me, and I have before me to refresh my recollection the form of CR-52. I would like to know, if you can tell me, the net earnings to average plant in service during the year 1923 of the New England Telephone & Telegraph Company as called for in the form first in this question identified.

Mr. Blackman: I object to that as irrelevant and immaterial as the New England Company not being in issue in this case and not bearing on any issue in this case.

Q. 307. Are you able to answer that question, Mr. Saxton? In order to proceed properly, I am first asking you, are you able to answer that question?

A. Not at the moment.

Q. 308. Would you be able, by refreshing your recollection by any documents or paper in your possession or under your control?

A. Yes.

Q. 309. And what would such documents or papers be that would so enable you to answer that question?

A. The monthly reports of the New England Company.

Q. 310. Now, I ask for an answer to that question; you may use those documents to refresh your recollection.

Mr. Blackman: The documents are not here and counsel instructs the witness not to refresh his recollection as to them.

Mr. Haight: Do I understand that, as counsel represent-
[fol. 7810] ing the A. T. & T. Company in this instance and the Illinois Bell Telephone Company, that the witness is instructed not to refresh his recollection to enable him to answer that question?

Mr. Blackman: You understand correctly.

Mr. Haight: Now, may it be understood, Mr. Blackman, that if I repeated the same question and went through the same procedure in regard to all the other information which would appear upon a report for the year 1923, CR-52, in respect to the New England Telephone & Telegraph Company called for in these various columns and if I should follow the same line of questioning in regard to each of the other companies here listed and if we questioned in a similar way in regard to each of the facts set forth on the filled out forms CR-52, CR-53, CR-54, 54A, 67, 67A, 67B, 76, 86, 91, 97 and 53A for each of the years 1919 to 1930, inclusive, that you would in each of those very many, several instances, give the same instructions and produce the same result, that is, that the witness would not be permitted to answer it or use that material?

Mr. Blackman: That is correct, with the single exception of the Illinois Bell. Any information concerning the Illinois Bell is at your disposal, and I might say that in instructing the witness to that effect, I am proceeding on the theory that your question is merely an indirect effort to get the facts in evidence that appear on a written document, the proper procedure being subpœna and the fact that the witness has stated that they would refresh his recollection or knowledge, I think it is obvious is not quite correct. The witness has no information or knowledge of the facts; all he has are the documents; he never knew the facts except as shown by those documents.

I want to make this plain, also, that we are not declining any information concerning the operations of the Long Lines Division, A. T. & T.; so far as that is concerned, if your question was broad enough to cover that, why, we are willing to disclose that.

Mr. Haight: I have put those questions in that way in order to save what obviously would be several days' time and it is in order that we may get the co-operation to save time that we have taken this wholesale method instead of repeating the specific question in each instance and as to each year and as to each——

[fol. 7811] Mr. Blackman: Yes.

Mr. Haight: And as to each fact?

Mr. Blackman: Yes.

The Witness (continuing): The data appearing in CR-52 line entitled "Total Associated Operating Companies" is prepared in our office. As to CR-53, some of the data doubtless appears on Associated Companies reports, some of it on the reports of Mr. Uhrig's division and how that is brought together, I cannot say. As to CR-53A, I cannot say.

As to CR-54, I believe that is all transcribed from the reports of the Associated Operating Companies and the Long Lines; the same answer as to CR-54A.

CR-67 is a summary of the reports of the Associated Companies and is prepared in my division. The same answer as to CR-67A and 67B. As to CR-76, a great deal of the data appearing is transcribed from the reports of the Associated Companies. I am not sure that it is all. The data appearing on CR-86 I think is substantially all prescribed from the Associated Company Reports except for the column headed "Total Associated Companies." CR-91 is all transcribed from the reports of the Associated Companies. CR-97 is data transcribed from other CR Reports.

Mr. Haight: Now, Mr. Saxton, I will ask you to produce in respect to each of these exhibits just identified again, all of the information that was computed in your division of the department.

Mr. Blackman: The same portion.

The Witness: Referring to Defendants' Exhibit 52, which was distribution chart for certain CR reports prepared in my division, there are certain persons named as distributees of certain reports who were not identified by departments —C. P. Cooper, Vice President, A. T. & T., is in the Operating Department, Operation C. Mr. E. V. Cox is under Mr. Cooper as Assistant Vice President. Mr. Gherardi is in the O. & E. Department. E. F. Carter is in the Operation Department, Operation H. G. B. Proud is Assistant Comptroller of Western Electric. W. A. Mason, O. & E., A. T. & T.; Mr. R. F. Wolff is of the same department as Mr. E. S. Wilson, who is Vice President, A. T. & T.

The following CR Report Forms were offered in evidence by defendants and objected to by plaintiff on the ground of

irrelevancy, immateriality and incompetency, the exhibit [fol. 7812] number corresponding being indicated:

CR-52—"Associated Operating Companies Excluding A. T. & T. Long Lines. Distribution of Total Net Earnings for the Month of ....."—Defendants' Deposition, Exhibit 92.

CR-53—American Telephone & Telegraph Company Earnings on Capital Stock—Defendants' Deposition, Exhibit 93.

CR-53A—Bell Telephone System United States—Defendants' Deposition Exhibit 94.

CR-54—Bell Operating Companies—Comparison of Results for .... months this year with same period last year—Defendants' Deposition, Exhibit 95.

CR-54A—Bell Operating Companies—Comparison of Results for .... Months this Year with Same Period Last Year—Defendants' Deposition, Exhibit 96.

CR-67—Associated Operating Companies Comparison of Actual Results with .... View—Defendants' Deposition, Exhibit 97.

CR-67B—Associated Operating Companies (excludes A. T. & T. Co. Long Lines Department) Present View of Next Year (in this instance 1932)—Defendants' Deposition, Exhibit 98.

CR-67A—Associated Operating Companies (excludes A. T. & T. Co. Long Lines Department)—Defendants' Deposition, Exhibit 99.

CR-76—Associated Operating Companies Statistical Units for .... Months Ending .... —Defendants' Deposition, Exhibit 100.

CR-86—Associated Operating Companies (excluding A. T. & T. Company's Long Lines Department) Unit Expenses for .... Months ending .... —Defendants' Deposition, Exhibit 101.

CR-91—Results of Operations by States (Annual Basis) Revenues and Expenses per average company stations and percentages—2 sheets—Defendants' Deposition, Exhibit 102.

CR-97—Bell Telephone System in United States, Months Ended ....—Defendants' Deposition, Exhibit 103.

Mr. Blackman: I object to each of the foregoing offers on the ground that each of the papers is incompetent, irrelevant

and immaterial on any issue in this case and on the further ground that it is merely an effort to gain information and to obtain comparisons for the purpose of attempting to work up something.

[fol. 7813] Provisional Estimates from the various Associated Companies, which would include the Illinois Bell, come to my division, but I would have to check to find out to whom else they go in the Comptroller's Department. Outside of the Comptroller's Department, I believe copies go to the O. & E. Department. I am not sure of any further distribution. Data from provisional estimates are used in the preparation of several of the CR Reports. No reports can be said to be compiled from the provisional estimates.

CR-67A and 67B I believe are all the CR Reports employing data derived from provisional estimates. Provisional estimates are not used in the compiling of CR-51 and 51A. Provisional estimates are made on forms. My division prepares a consolidated Bell System estimate for the entire system from the provisional estimates and copies of the consolidated estimate are sent to the O. & E. Department and doubtless to other divisions of the Comptroller's organization. I will check up and ascertain to whom these provisional estimates go.

Defendants then requested that plaintiff produce a set of forms and instructions in connection with such forms, in use from 1919 to 1930, both inclusive, with respect to provisional estimates; also the provisional estimates relating to the Illinois Bell Telephone Company for each of those years.

The Witness (continuing): I don't think there are any special letters or instruction or memoranda that go to any of the departments or individuals with CR Reports as indicated on Defendants' Exhibit 52, being the distribution chart for CR Reports in my division.

Defendants request that plaintiff produce for each of the years 1919 to 1930, both inclusive, CR Reports 51B, 55, 55A, 65, 65A, 66, 92 and 94.

By the Witness: I don't know of any reports from Associated Companies showing estimated annual revenue effect of contemplated or pending rate changes, going to any one in the Comptroller's Department. The same answer as to estimated annual revenue value of rate changes.

I located the circulars covering the bond issues I testified about. The circular bearing at the top the legend "$125,000,000 Total Issue A. T. & T. Co. 25 Year Sinking Fund 5% Gold Debentures dated Jan. 1, 1925, due Jan. 1, 1960" marked for identification Defendants' Deposition, Ex-[fol. 7814] hibit 104.

The circular bearing the legend "$100,000,000 A. T. & T. Co. 25 Year Sinking Fund 5½% Gold Debenture Bonds, dated Nov. 1, 1923, and due Nov. 1, 1943"—marked for identification Defendants' Deposition, Exhibit 105.

The circular bearing legend at the top "$150,000,000 A. T. & T. Co. 35 Year 5% Gold Debentures dated Feb. 1, 1930, and due Feb. 1, 1965"—marked for identification Defendants' Deposition, Exhibit 106.

I think my division obtained them from J. P. Morgan & Company. I think such of the information as is contained in these documents relative to the Bell System was furnished by my division. Data as to the A. T. & T. Company was probably obtained from Mr. Uhrig's Division.

I know that there was distribution of the documents and that a large edition was prepared. The bond issues were to be sold and we were asked to prepare certain information, and I assume that J. P. Morgan & Company used them for that purpose.

Information necessary in the preparation of similar documents for Associated Companies would be obtained from the Associated Companies. We might assist, however, in that instance.

I will see if there is any similar information or documents in the files of my division with reference to the bond issue of the Illinois Bell of 1923—$50,000,000.

Defendants' Deposition, Exhibits 104, 105 and 106, offered and received in evidence.

I don't think the Comptroller's Department gets reports from the Associated Companies showing the discounts on bonds sold to bankers, and I don't know that any division receives such reports. The total amount of bond discount and expense is, of course, shown on the Company's regular report. That includes the total to date, not only discount on the issues but the expense in connection therewith. The amount of bond discount and expense appears on the regular reports of the company which are kept in my division.

I will check to ascertain whether there is in my division a record of the bond discounts of the various bond issues sold by the Associated Companies of the Bell System from 1919 to 1930, both inclusive. I think Mr. Uhrig's division would [fol. 7815] have the records as to discounts on these three bond issues mentioned in Exhibits 104, 105 and 106.

CLYDE UHRIG, recalled.

Further direct examination.

By Mr. Haight:

I have a distribution chart showing the CR Reports prepared in my division and to whom such reports are distributed, which distribution chart is marked Defendants' Deposition, Exhibit 107 for identification. The names appearing upon the chart to whom different reports are distributed are as follows:

Directors and Executive Committee, A. T. & T.—self explanatory.

E. F. Carter, Vice President in charge of Personnel Department.

C. P. Cooper, Vice President.

W. S. Gifford, President.

Official File—Self explanatory.

C. A. Heiss, Comptroller.

B. Hamilton in Mr. Saxton's division.

J. F. Behan, Assistant Comptroller.

H. Blair-Smith, Treasurer.

T. H. Brown, Jr., Treasurer's Office.

C. Uhrig, Assistant Comptroller.

J. W. Green, Auditor.

J. A. Nixon, Assistant Comptroller, Uhrig's Department.

E. V. Cox, Assistant Vice President.

S. L. Andrew, Chief Statistician.

P. W. Saxton, Assistant Comptroller.

H. J. Brandt, Benefit & Medical Department.

B. Gherardi, Vice President.

E. S. Wilson, Vice President.

A. A. Marrsters, Secretary.

A. H. Ware, Assistant Comptroller, Uhrig's division.

J. L. R. Van Meter, Assistant Vice President.

F. B. Jewett, Vice President.

A. G. Swede, in office of Vice President Gherardi.
J. W. Van Sant, in office of Assistant Comptroller Behan.
W. A. Beckert, same office.
[fol. 7816] E. J. Clarke, Assistant Treasurer.
C. S. Van Cise, Assistant Treasurer.
A. W. Page, Vice President.
H. J. Foster, in Vice President Cooper's offic
C. M. Bracelen, Vice President and General Counsel.
L. Moll, in office of Treasurer.
R. B. Shaver, Assistant Comptroller.
W. J. Stout, Assistant Treasurer.
C. O. Bickelhaupt, in office of Vice President Cooper.

The executive committee consists of James S. Alexander, George F. Baker, Walter S. Gifford, Philip Stockton, David F. Houston and Daniel Willard. There may be one more. Mr. Alexander was the former president of the National Bank of Commerce in New York. Mr. Baker is Chairman of the First National Bank of New York; Mr. Gifford is President of this company; Mr. Philip Stockton is President of the First National Old Colony Bank of Boston. Mr. Houston is President of Mutual Life Insurance Company of New York. Mr. Willard is President of the B. & O. Railroad.

None of the CR Reports prepared in my division are based upon the monthly reports from the Associated Companies identified as follows: MR 1, 2, 3, 4, 5, 6, 7, and CR 22a, 22b, 22c, 23 and the special report that is used for CR Report 91. None of the reports prepared in Mr. Saxton's division form the basis for reports prepared in my division. In my division there is a record kept of the discounts in respect to the different bond issues referred to by Defendants' Exhibits 104, 105 and 106.

I have here a tabulation which refers to the three bond issues, respectively, which shows total discounts and expenses. Practically 100 per cent are expenses of A. T. & T. The large factor there is the cost of engraving the bonds.

If I can segregate the expenses incurred by Morgan & Company and those incurred by the A. T. & T., I will do so.

The tabulation mentioned is marked Defendants' Deposition, Exhibit 108 for identification.

My division does not receive from Associated Companies a report of estimated annual revenue affected by contemplated or pending rate changes. I don't know whether any

such reports are received by my division in my department. My division does not receive anything having to do with [fol. 7817] estimated annual revenue values on rate changes from any of the Associated Companies, and I don't know that any other division in my department does receive such reports.

JAMES F. BEHAN, for defendants.

Direct examination.

By Mr. Haight:

I reside Montclair, New Jersey; I am Assistant Comptroller, A. T. & T., and have been connected with that company since 1912 in the Comptroller's Department. I occupied my present position since middle of 1920. Immediately prior to 1920 I was Chief Accountant; prior to that I was Assistant Chief Accountant; prior to that Senior Accountant; prior to that, Accountant.

I have before me Defendants' Deposition, Exhibit 51, which is an organization chart of the Comptroller's Department, and my division is indicated thereon.

The word "Revenue" in my division must be read in connection with the title above and refers to division of methods, revenue accounting methods, and should read "Revenue accounting methods and results." We develop the forms used and methods covering all phases of the revenue accounting work, developing forms, methods of compiling the various kinds of revenue services, such as exchange and toll; forms for controlling the billing against subscribers and for classifying revenues and for furnishing the information necessary for the journal entry to the final accounts on the general books.

The purpose of preparing the forms is to give advice and assistance to the Associated Companies. They are not used to report the results to the A. T. & T. Central Organization. They are used only in the Associated Companies and to some extent in the Long Lines Department. We do not have anything to do with the development of forms for reporting to the central organization.

In connection with our studies of accounting routines, we very often have to make cost studies of present practices in order to compare them with the costs of a new practice under

study. That part of the work is done from time to time. We have, of course, some detailed procedure under study all the [fol. 7818] time. In some of these studies it is necessary for us to consider the element of cost; in others it is not. We make a cost study on some phase of the accounting work at least once each year.

We do not allocate the expense of doing this work to particular Associated Companies in any way. I cannot from looking at our records tell how much the cost of the work done for the Illinois Bell Company was for any of those services. For the Associated Companies we actually make comprehensive audits of the accounts and records of each company and the Long Lines Department annually. The purpose is as a service to the Associated Companies in order to determine that their accounts are correctly kept and that their underlying records substantiate the entries on the general books, that financial position is that stated on their balance sheet and that their income for that year is that stated in their income accounts. That knowledge as to financial condition is not necessarily used by A. T. & T. Company because we receive their monthly reports directly from them and unless in the audit we find a situation different from that reported in the monthly reports, there would be no use for the information we bring in as the result of our audits.

Not to my knowledge are the audits used in determining what advances shall be made to the Associated Companies. They are not relied upon in connection with such dealings except to the extent that the officers are interested in knowing that the accounts of the Associated Companies are correct, as shown by their reports to us.

The item "Field Studies and Accounting Methods and Results," relates to studies we make in the offices of the Associated Companies with respect to the best means of accounting routines, and such studies are made to the end of developing the most efficient and economical way of performing the accounting work, there being a necessity for constantly doing that. The necessity arises through the rapid growth of the business and the great volume of detailed work underlying our accounts. Systems are devised and continuously studied and kept up to date, taking into account the growths to which I have referred.

Every increase of the business does not necessarily require some change in our system of accounting or audit. However, we advise as regards changing when conditions [fol. 7819] justify such advice. I cannot answer as to whether that advice is advice that one would expect the Accounting Department of any institution doing business to need from the outside, but that advice is necessary for accounting in the Bell System, either locally or through a central organization to constantly study the routines underlying the handling of the great volume of business which we have to handle. That would be necessary regardless of reports made to A. T. & T., and the fact that reports are made to the A. T. & T. does not directly have anything to do with it, that I can think of.

When new devices come on the market, we consider them, consider their application to accounting work and make studies to see whether it is advisable to install such mechanical devices. If we determine that it is advisable, we make recommendations to the Associated Companies, if our conclusions justify them. We make general recommendations to all. Such recommendations are not necessarily followed. They may or may not be. To a great extent they are. However, I know of no instance where all the Associated Companies have refused to follow recommendations as to the use of mechanical devices in accounting work. We develop the procedure and forms for the companies necessary to be included in the Federal income tax returns. We consolidate the data furnished by the companies to be included in the consolidated returns. All of the clerical processes involved in the preparation of the consolidated returns are done in my division.

We develop the underlying routines of all thrift plans, which includes the employees stock plan. The legend "Employees Stock" embraces employes of the Bell System, and the stock referred to is the stock of the A. T. & T. It includes employes of the Western Electric, E. R. P. I., all of the subsidiaries of the Western Electric, and the Long Lines Department, Fidelity Bonding & Apportionment Methods refers to the handling of all matters relating to a blanket fidelity bond covering all of the employes of the Bell System. We handle all the dealings with the bonding company other than the filing of the claim. There is one blanket fidelity bond to cover all the employes. Every

employe from office boy to president of every company in the Bell System is covered. The insured is the American Company and each of the Associated Companies and the Western Electric and certain of its subsidiaries. Each com- [fol. 7820] pany pays its pro rata of the premium. It is charged separately to the Associated Companies and the Western Electric and such other companies as may be included. The premium is apportioned on the basis of the number of employes in each company falling within the three classes of employes provided for in the bonding rates; the blanket bond specifies rates for Class A, B and C employes.

In 1918 we commenced preparing consolidated income tax returns for A. T. & T. and Associated Companies in the Bell System. Some of the licensees or Associated Companies during this period have shown a taxable loss. That shows in the returns themselves. The Associated Companies are billed for their share of the income tax payment on the basis as they would pay if they filed their returns individually, except that if any companies controlled by an associate company and included in the consolidated return had a deficit, this deficit would be deducted from the taxable income of the controlling company.

I have computed how much the saving was to A. T. & T. Company by paying on the basis of consolidated income tax and charging on the basis of a separate income tax return to each of the Associated Companies. I have not the computation right here but it can be made available. I have either a pen and ink copy or a typewritten statement in my office.

(Defendants' Deposition Exhibit 78, omitted at this point.)

EDGAR S. BLOOM, for defendants.

Direct examination.

By Mr. Haight:

I reside at New York City; I am president of Western Electric and have been since August 1, 1926; I am a director in practically all the Western Electric subsidiary companies and am President of the Weco Corporation; I am a director of E. R. P. I., Teletype Corporation, Manufacturers Junc-

tion Railway and eight or ten small foreign subsidiaries of Western Electric Company.

The Weco Corporation is engaged in holding securities that were formerly owned by Western Electric.

I am a graduate of Engineering Department, University [fol. 7821] of Pennsylvania, 1895, and had one year post graduate work. In July of 1896 after I completed my post graduate work, I became connected with Metropolitan T. & T. Co., which was the predecessor of the present New York Telephone Company; was then in the Traffic Engineering Department for about a year; then I was transferred to the Construction Department and became foreman of construction gangs; after about a year I became construction engineer of the company and remained in that position until 1906; then I became Superintendent of Plant of the New York & New Jersey Telephone Company in Brooklyn for about a year and then Superintendent of Plant of the New York & New Jersey Telephone Company in New Jersey. Thereafter, I was General Superintendent of Plant of Pacific T. & T. Co., operating throughout the Pacific Coast; in 1909 I came back east with the A. T. & T. in charge of general supervision of Plant Operation of the Bell System, from the standpoint that the American Company supervised plant operations. Then I was Superintendent of Plant of the New York Telephone Company for the upstate property that they acquired throughout New York State, except the old Metropolitan area here in New York.

I went then to St. Louis in the spring of 1912 as Vice President of the four companies operating throughout the Southwest, that were combined into the Southwestern Bell System, and was there two years; I went to Chicago as Receiver of the Central Union Telephone Company for four years; became President of the Ohio Bell and Indiana Bell; Vice President of Illinois Bell; then I came back to New York in 1922 as Vice President, A. T. & T., and on August 1, 1926, became President of Western Electric.

Also, I am a director of the Bell Laboratories.

The Western Electric owns the entire capital stock of the Teletype Company and acquired it I think about October 1, 1930. The Teletype Company manufactures teletypewriters for use in connection with signalling over wires. At the time the Teletypewriter Company was acquired by Western, it had a Development & Research Department of its own and

still has it. I don't personally recall how large it is, but it was an organization satisfactory to the size of that corporation and carries on all the development work of the Teletype Corporation.

I had to do with the organization of E. R. P. I., in that I [fol. 7822] organized it. At the time it was organized the talking movies were not what they are today but the corporation was organized primarily in the first instance to take out of the Western Electric functions that were not related directly to the Western Electric as a manufacturing company, so that we transferred to E. R. P. I. all outside securities and also transferred to E. R. P. I. the rights under the talking movie patents, but as that business developed and the talking picture business became a large business, we again took the securities out of E. R. P. I. and put them into the Weco Corporation, but at first it was merely for the securities and for the original development of the talking movies.

We had a department in Western Electric at that time and we transferred that organization right over to E. R. P. I.

I am referred to an article which appears in the March, 1930, issue of the Western Electric News entitled "Foresight and Farsight in Purchasing," which quoted words are preceded by the words "Here, Mr. Secretary of Commerce, is the answer of one industry," and immediately beneath are the words "No. 5 of a series inspired by the report of Secretary Hoover's committee on elimination of waste" and beneath that appears the following:

"Foresight and Farsight in Purchasing. At Western Electric a highly trained purchasing staff is the 'lookout' that guides the purchasing for practically the entire telephone industry.

"The basis for all this is the unique relationship between Western Electric—which purchases, manufactures and distributes,—and the Bell System, which utilizes the nation's telephone equipment. This great telephone system computes and transmits to Western Electric a general view of its requirements five years ahead, detailed schedules one year ahead.

"To meet such long time planning this company must make sure in advance of its source of supply. Before any source dries up it must seek another, perhaps at some remote corner of the earth. When a shortage of one material

threatens it must find another material every bit as reliable. It also must buy at prices which are fair to the seller, in order that he may remain a reliable source of supply.

"This purchasing control correlates material with machinery of production, it avoids excessive inventories, it [fol. 7823] is an important factor of economy."

Beneath the above, appear the words "Western Electric, purchasers, manufacturers, distributors, since 1882 for the Bell System," and beneath that the words "This Western Electric advertisement was included in 'The Advertising Parade' published to make a permanent exhibit of the exceptionally good work in the field of 1928."

I think that is a fair statement as of that time.

R. W. Burgess is the chief statistician of Western Electric. I am referred to an article by Mr. Burgess which appears in the May, 1930, issue of Western Electric News, beginning on page 3 and running to page 6 and continued to and concluding on page 56. I am referred to certain extracts from that article as follows:

"Many of the outstanding peculiarities of Western Electric methods of operation are natural consequences of its close affiliation with A. T. & T. Company and its associated operating telephone companies. Such affiliations between organizations engaged in different stages of the industrial process is what the economist calls vertical integration. Examples of vertical integration in others fields are:

"a. Steel companies which own coal mines, ore lands, boats to carry ore on the lakes, and coke ovens as well as steel mills of various types.

b. Oil producing, refining and marketing combinations.

c. Chain stores which purchase direct from factories or even themselves own factories, in the first case combining the functions of retailer and wholesaler and in the second case, the functions of retailer, wholesaler and manufacturer.

d. Copper mining and refining companies which also own wire drawing plants, brass works and other fabricating units.

"The question as to whether such integration is or is not desirable from the general economic standpoint is illuminated by the experience of the Western Electric Company. As we know from our daily contacts, the identity of the inter-

ests of the Western Electric Company with those of our chief customers makes unnecessary much risk-taking and much expenditure of money and energy that inevitably occur when each sucessive step from raw material to service rendered yields a profit for a different set of stockholders. As a natural result of these savings, Western Electric prices to Bell Telephone Companies are distinctly lower [fol. 7824] than the prices of other telephone manufacturers to non-Bell telephone companies. Or, putting it another way, the margin between cost of raw material and essential labor and the selling price of the product is relatively small.

"Specific ways in which integration results in real savings are as follows:

"1. Sales effort in the ordinary sense is dispensed with. In a sense, Western Electric products are sold before they are manufactured. Representatives of the telephone companies know that the designs have been worked out by the Bell Laboratories and approved by the general departments of the A. T. & T. Company as the best for the purpose. When material of several designs is produced, the Western Electric representative has no object in urging one over the other and is free to pool his technical knowledge with that of the telephone company's representative.

"2. Continuity in engineering and production schedules is secured by co-operation with the telephone companies. If the preliminary line-up calls for peaks and valleys during the next year or two, arrangements are made with the telephone companies to rearrange the dates of enough projects to smooth out the schedule. As a result, the plant investment required by the Western Electric Company is low in relation to sales volume.

"3. Profit above a fair rate of return on investment is eliminated.

"4. Losses due to production of items which later prove unacceptable to the ultimate consumer are minimized.

"5. Opportunities within the system are provided for all types of employes. A man who starts in one company may be transferred to another company or to another department which requires a distinctly different type of personal qualifications.

"In addition to integrating public utility operation and equipment manufacturing the Western Electric Company also exemplifies integration of manufacturing and acting as purchasing agent. An important advantage of this sort of integration as exemplified by the Western Electric Company is that, as purchasing agent, the company can obtain better prices and terms than if it were not known that we may, as an alternative, manufacture ourselves. Our own familiarity, [fol. 7825] moreover, with manufacturing processes enables us to discuss more effectively with outside producers what is really a fair price.

"Space does not permit full discussion of the third way in which the Western Electric Company can serve the economist as a specimen, namely, the advantages of research work.

"It is an accepted operating principle of the Bell System and other progressive organizations that every item of equipment and every method is subject to improvement. Research of the engineering type is fairly common in these days. In the Bell System and several other leading concerns, however, this work has been extended to underlying physical, chemical and mathematical problems with a definite realization that it is worth while to conquer the unknown in connection with the broad field in which particular investigations have been made, even though the particular study may not have an immediate dollars and cents value. In the Western Electric Company the spirit of research has also been carried into methods of manufacture, sources and proper prices of raw materials and supplies and all methods of operation."

As to whether I agree with the extracts from the article which I have read, I would not want to answer as to the first part yes or no, unless I first studied steel corporations. I have not studied chain stores nor copper mining companies. I don't know the detail of the integrations of those other companies.

Referring to the portion of the article which reads as follows: "As we know from our daily contacts, the identity of the interests of the Western Electric Company with those of our chief customers makes unnecessary much risk-taking and much expenditure of money and energy that inevitably occur when each successive step from raw material to service rendered yields a profit for a different set of stock-

holders. As a natural result of these savings, Western Electric prices to Bell Telephone Companies are distinctly lower than the prices of other telephone manufacturers to non-Bell telephone companies," I would answer yes, because that affects certain things that are useless where we have such a close connection and close coopération, but that doesn't mean, however, that we do not have other risks. We do.

The following statement is correct:

[fol. 7826] "As a natural result of these savings Western Electric prices to Bell Telephone Companies are distinctly lower than the prices of other telephone manufacturers to non-Bell telephone companies."

Specific ways are then mentioned in the article in which that occurs and with that statement I agree in the ordinary course, because those savings are passed on to the Bell Companies.

As to the portion of the article which reads as follows:

"Sales effort in the ordinary sense is dispensed with. In a sense, Western Electric products are sold before they are manufactured. Representatives of the telephone companies know that the designs have been worked out by the Bell Laboratories and approved by the general departments of the A. T. & T. Company as the best for the purpose. When material of several designs is produced, the Western Electric representative has no object in urging one over the other and is free to pool his technical knowledge with that of the telephone company's representative." I don't know what sense he is referring to, but because of our close relationship, we have a very good idea of what they probably will require, but it is not a firm order until we get their order. That is, we have provisional estimates, but they are not firm orders. We know fairly definitely as to what they estimate the requirements to be for a year ahead and in a very broad way for five years ahead, and then in addition to that, each month each of our distributing houses keeps in close touch with the local telephone company and reports to us any change in plans.

The Western Electric in its relation with the Bell System has no selfish interest in promoting the sale of any particular apparatus. We are entirely out of ordinary competition and we do not design something that may have a particular sales appeal. It is developed through the Bell

Laboratories and when it is approved and made standard, it is on such a basis that we manufacture it and we do not ever design anything to give it a sales appeal.

The following statement in that article is correct:

"Continuity in engineering and production schedules is secured by cooperation with the telephone companies. If the preliminary line-up calls for peaks and valleys during the next year or two, arrangements are made with the tele- [fol. 7827] phone companies to rearrange the dates of enough projects to smooth out the schedule. As a result, if the preliminary line-up calls for peaks and valleys during the next year or two arrangements are made with the telephone companies to rearrange the dates of enough projects to smooth out the schedule. As a result, the plant investment required by the Western Electric Company is low in relation to sales volume."

With reference to the last mentioned quotation, it is correct with this qualification, it might be that in Denver there are two central offices equipments ordered and they schedule them both at the same time. That would mean that we would be at a peak for those six or seven months and we would ask to put one back a little and one forward a little so that we could keep an average force going continuously for more than six months. That is the theory. If you cut out the peaks and valleys, you have a fair return of investment and a complete working schedule.

The statement is correct that "losses due to production of items which later prove unacceptable to the ultimate consumer are minimized," because everything is approved and standardized before it is put into production.

The following statement answers itself:

"Opportunities within the system are provided for all types of employes. A man who starts in one company may be transferred to another company or to another department which requires a distinctly different type of personal qualifications."

With reference to that, I would say that the broader the scope of the work, the more you can transfer people around.

Assuming that the Western Electric manufactures and acts as purchasing agent, the following statement is correct:

"In addition to integrating public utility operation and equipment manufacturing, the Western Electric Company

also exemplifies integration of manufacturing and acting as purchasing agent."

I do not agree exactly with the following statement in said article:

"An important advantage of this sort of integration as exemplified by the Western Electric Company is that, as purchasing agent, the company can obtain better prices and terms than if it were not known that we may, as an [fol. 7828] alternative, manufacture ourselves."

There are two features there, first and last; in this case, in order to get the lower prices, and second, failing to get those prices we can manufacture ourselves.

The statement is correct that:

"Our own familiarity, moreover, with manufacturing processes enables us to discuss more effectively with outside producers what is really a fair price."

I am referred to an article by me in the January, 1929, issue of the Western Electric News entitled "The Bell System and Ourselves." "Our president traces the development of the telephone art and indicates a growth for the future." I will read that article and let you know later whether I agree with it as of that date and whether it expresses my views as of the present time.

I am referred to an advertisement in the Western Electric News, September, 1928, as follows:

"Here, Gentlemen, of the Committee, is the Answer of One Industry. A One-Way Street Production Policy.

In telephone making, production schedules move in one direction—forward. The machinery seldom needs to be thrown into reverse.

"Cancellations in this industry are rare.

"There is consequently little lost effort involving men, material and machines.

"There is a minimum of waste in scrapping or storing partially fabricated parts.

"How is this possible?

"Because of the close relation between Western Electric as purchasers, manufacturers and distributors and the operating telephone companies of the Bell System served by it.

"Here is another striking economy which contributes to the low cost of your telephone service.

"Western Electric, Purchasers — Manufacturers — Distributors." And the letter "f" in the word manufacturers" has a line which includes this legend: "Since 1882 for the Bell System."

Allowing for the poetic license of the man that writes an advertisement, that is generally a correct statement.

I am referred to an advertisement in the Western Electric News, May, 1928, as follows:

"Here, Mr. Secretary, is the answer of one industry." [fol. 7829] And then the heading, "Planning moves five years ahead."

"Seasonal production with all its economic disturbance persists as an evil in many American industries. But in telephone making it has well-nigh disappeared.

"Western Electric knows substantially what it must produce five years hence because of its close relation to the Bell System. Telephone engineers, skilled in gauging population trends in the growth of telephone service establish the requirements to which Western Electric directs existing production facilities and provides for additional facilities when and where needed.

"What follows is a production curve relatively free of peaks and valleys. Inventories are kept at a minimum, machinery is busy, employment is stabilized, plant investment is accurately related to production needs, wages have progressively risen relative to the cost of living while prices have been substantially reduced.

"Thus does Western Electric by balancing production with demand, eliminate waste in the great industry of telephone making.

"Western Electric.

"Purchasers—Manufacturers—Distributors."

And relating to the "Manufacturers," the words "since 1882 for the Bell System."

The statement in the above was correct as of that time and it was based upon 30 years' past experience, but we are in the world's greatest depression and it does not certainly apply to the situation today. It could not.

I cannot say, but Mr. Stoll is familiar with the details as to whether the D. & R. Department of Teletype Corporation is larger or smaller than it was when the concern was taken over by Western Electric. None of the D. & R. work of Teletype, however, has been done by A. T. & T.

I am familiar with the work done in the Department of D. & R., A. T. & T. and the work done in the D. & R. Department of the Teletype Corporation is of the same general nature. It has to do with the fundamental development of Teletype, but it has entirely different activities.

[fol. 7830] ARTHUR W. PAGE, for defendants.

Direct examination.

By Mr. Haight:

I reside at Long Island; I am vice-president, A. T. & T. and have been since January 1, 1927. I was not connected with the company before that. Prior to that time I was a partner in the publishing firm of Doubleday, Page & Company, ever since I left college. My department in A. T. & T. is the Information Department. That department does the advertising and publicity for the Bell System, which is of a common nature for all of its parts. We consult with the operating companies about their public relations.

Defendants' Deposition Exhibit 109 is a photostat of the organization chart of my department. I am a director in the Southern Bell Telephone Company and am president of the Bell Securities Company and am on the committee of the Long Lines.

The Bell System Technical Journal is a publication issued regularly by A. T. & T. Likewise the Telephone Almanac and General Information. The Headquarters Bulletin is an official publication of the company. So, also, is the Bell Telephone Quarterly. All the publications listed on this chart were gotten out by our department, but they are not necessarily all regular official publications in the sense that that term is used in the publishing business. They are not all issued at stated times and they are not all necessarily entered as second class mail.

We advertise in order to promote the good will and sales of telephones and the Bell System. We place advertising in national magazines for the Bell System and those magazines circulate in the territory of each of the companies. It is advertising which applies to each particular company in its own particular area. The adver-

tising, however, does not state the name of any particular associated company.

We make no allocation of expenses as between the various associated companies. We have, however, two allocations. Long Lines pays for its own advertising and Bell Telephone Securities Company pays for all of its advertising. Otherwise we pay for the rest of our operations.

Long Lines advertising relates to long distance tele- [fol. 7831] phone service, whether it be carried on the lines of the Long Lines or associated companies. I place that advertising. I place the advertising for the Bell Telephone Securities Company, which relates generally to the securities of the A. T. & T. and some securities of the associated companies such as bonds.

I have been consulted during the last year in respect to allocation as between the associated companies and A. T. & T. of expenses of Information Department. I talked to Mr. Heiss about it two or three months or more than that ago. I made an allocation on the estimate of the time that I spent on the things that could be possibly attached to the A. T. & T. I have not an estimate here. I made an oral estimate to Mr. Heiss.

I made some memo about it. I haven't it. You will have to ask Mr. Heiss about it. I gave it to him. I haven't any copy of it. Mr. Banning and Mr. Cook helped me prepare it. I think — was signed by me. I put down on that memo the advertising that we did for Long Lines and the Securities Company. I allocated other expenses of the Information Department in addition to advertising to the Associated Companies, the A. T. & T. or the Bell Telephone Securities Company. I allocated the two pieces of advertisement I told you, outside of their particular purpose.

There were some minor costs. I think I allocated something for a half dozen or more publicity statements of finances of the American Company that we get out—quarterly statements for the company. I allocated that all to A. T. & T. I allocated to the Associated Companies expenses relating to finances, only such financial pamphlets as the Associated Companies asked for. That was to the Associated Companies as a whole.

The Headquarters Bulletin is charged in proportion as the people to whom it goes serve the Associated Companies or the A. T. & T. A separate charge was not made again

each of the Associated Companies on that, a lump charge against all and allocated as between them on the one hand and the A. T. & T. on the other.

The Bell Telephone Quarterly was allocated to the Associated Companies. Bell Technical Journal the same. Telephone Press Service the same way. It only goes to the Associated Companies. Telephone Almanac the same way as that, only goes to the Associated Companies. [fol. 7832] Except for the Headquarters Bulletin, none of these publications were in any wise charged to any entity in the Bell System other than the Associated Companies. None of these publications go to investors or to financial houses or to brokers. The Almanac goes to the Associated Companies who distribute it as they see fit. Some of these publications may go to people of the Western Electric who get the Technical Journal—their engineers. Associated Companies supply us with a list and we send them to the individuals in their company. The Technical Journal has about 2,000 paid subscribers and it is also sent to the telephone engineers and scientists abroad, who obtain scientific knowledge from it and from whom we hope to get corresponding knowledge in return. The Bell Quarterly goes to people in the Bell Telephone Laboratory and the Western Electric designated by said organizations.

In each of the Associated Companies there is a Public Relations Department, not always under that title but of that general character, and it is usually headed by a vice-president and it is his function to endeavor to see that the operations of the company are not only technically well carried on but in a manner pleasing to the public which it serves. Our relationship to those departments is as counsel to help do that and in doing so we have the usual annual conferences and also people from our department travel about from time to time and keep in touch with them constantly by telephone, etc. The expense of doing that work is allocated generally to the Associated Companies. But it is not allocated in the regular course of business. The allocation I refer to was in the memo to the operating companies as a whole.

No charge is made for the Bell Telephone Quarterly to any particular company on account of the list furnished by that company. The Bell Telephone Securities Company issues publications. I have in mind the Bell Tele-

phone Securities. That goes to bankers, brokers and stockholders who ask for them,—to whoever asks for them, such as prospective investors. It is not done, however, very extensively.

Defendants' Deposition Exhibit 110 for identification is from Bell Telephone Securities, dated April 15, 1931, the title page and prefatory note of which appears on page 3, and the article entitled "Organization and Financing of [fol. 7833] the Bell System," beginning upon page 6, terminating on page 26 and the titles, charts, maps, graphs appearing opposite several of the pages; also including the map opposite page 7, entitled "Toll Lines of the Bell System, Inc., in One Comprehensive System of Communication."

Defendants' Deposition Exhibit 111 for identification is from a Bell Telephone Securities Company issue dated April 15, 1930, and includes the chart appearing on page 14, table of statistics upon pages 19 and 20 and the subject matter and table of statistics and all matter appearing upon pages 25 to 28, both inclusive.

Defendants' Deposition Exhibit 112 for identification is from the Bell Telephone Securities Issue dated April 15, 1929, and includes two charts appearing upon page 10 and the subject matter appearing upon pages 25, 27, 28 and 29.

Defendants' Deposition Exhibit 113 for identification is from Bell Telephone Securities Issue dated April 15, 1928, and includes pages 17 to 23, both inclusive, and pages 25 to 29, both inclusive.

Defendants' Deposition Exhibit 114 for identification is from Bell Telephone Securities Issue dated April 15, 1927, and includes subject matter appearing on pages 5 to 27, both inclusive.

Defendants' Deposition Exhibit 116 for identification is from Bell Telephone Securities Issue dated May 1, 1926, and includes two charts upon page 8, one upon page 10, another upon page 11 and subject matter beginning on page 13, with the heading "Finances of the System," to and including page 16, and the charts and graphs therein appearing, and also pages 20 to 27, both inclusive, and pages 29 to 31, both inclusive.

Defendants' Deposition Exhibit 116 for identification is from the Bell Telephone Securities, issue dated April 1,

1925, and includes page 5, pages 20 to 27, both inclusive, and pages 29 to 31, both inclusive.

Defendants' Deposition Exhibit 117 is from Bell Telephone Securities, issue dated May 1, 1924, and includes the chart being on page 20 and all the material appearing upon pages 29 to 31, both inclusive.

Defendants' Deposition Exhibit 118 for identification is from Bell Telephone Securities, issue dated May 1, 1923, and includes all material appearing upon pages 5 to 22, [fol. 7834] both inclusive, and upon page 24, 26 and 27.

Defendants' Deposition 119 for identification is from Bell Telephone Securities, issue dated May 1, 1922, and includes pages 16 to 21, both inclusive, and also matter on page 23.

(In connection with each of the foregoing exhibits for identification, 110 to 119, both inclusive, the title page of each is included as part of the exhibit.)

Defendants' Deposition 120 for identification is a pamphlet entitled "Some Financial Facts About Bell System comprising American Tel & Tel. and Associated Companies," etc.

Defendants' Deposition Exhibit 121 for identification is pamphlet entitled "Others" Opinions Concerning the Investment Merits of the American Tel. & Tel. Stock," etc.

The Witness (continuing): Defendants' Exhibit 120 for identification was issued in March, 1931, by the Bell Telephone Securities Company. I have seen Defendants' Exhibit 121 for identification, but that was published before I came with the company. I think it has been distributed since I came with the company, but not very much. The other one, Exhibit 120, has been distributed continuously.

I had nothing to do with any of the exhibits except to read them as they come in. They come to me after they are prepared for my approval of their issuance, but I do not myself prepare the work or the figures.

Referring to Exhibits 120 and 121, I would say that they would be prepared by the proper people of the Bell Securities Company who are also part of the treasurer's organization A. T. & T. I do not prepare the material contained in the Bell Securities publications.

Mr. Thompson: Counsel for the defendants have sub-

mitted 11 requests with respect to the production of contracts, agreements and other written instruments from the files of the Western Electric Company.

With respect to No. 1, an agreement between the International Western Electric or International Standard Electric and the Western Electric Company, December 30, 1926, we have been unable to find any such agreement.

There is an agreement as of that date between E. R. P. I. and the Western Electric Company, a copy of which was produced by Mr. Otterson and offered in evidence by the defendants during the course of his testimony.

[fol. 7835] Request No. 2: We now produce an agreement between Western Electric and the International Telephone & Telegraph Corporation and the International Western Electric Company, Inc., dated August 14, 1925;

Also, an agreement between the Western Electric Company, Inc., and the International Western Electric Company, Inc., dated October 1, 1925.

Also an agreement between Western Electric and the International Standard Electric Corporation dated March 30, 1928;

With respect to Request No. 3: We produce an agreement between the International Telephone Sales and Engineering Corporation and the Western Electric Company, Inc., dated May 24, 1927. It is my understanding that this contract was assigned by the International Sales and Engineering Corporation on October 13, 1927, to the Automatic Electric Company. I did not understand that your request was broad enough to require the production of the assignment. However, if it is desired, I will produce it.

With respect to Request No. 4: We produce an agreement between the International Western Electric Company, Inc., and the Northern Electric Company, Ltd., dated January 1, 1919;

Also an agreement dated August 27, 1919, between the International Western Electric Company and the Western Electric Company, Ltd.;

Also an agreement dated May 16, 1923, between the American Telephone & Telegraph Company, the Western Electric Company, Inc., the International Western Electric Company, Inc., the Northern Electric Company, Ltd., and the Bell Telephone Company of Canada, Ltd. It is my understanding that this has been assigned to the Western Electric Company as of September 30, 1925, the date when th

Western disposed of its holdings in the International Western Electric Company.

Mr. Goldstein: May we have that assignment?

Mr. Thompson: I see no reason why we won't produce the assignment, although I do not understand that it was covered by the scope of your request.

With respect to Request No. 5: We produce agreement dated October 11, 1928, between the Western Electric Com-
[fol. 7836] pany, Inc., and Graybar Electric Company, Inc.

With respect to Request No. 6: We produce an agreement between the Western Electric Company, Inc., and Stromberg Carlson Telephone Manufacturing Company dated August 13, 1923.

With respect to Request No. 7: We produce an agreement between the Western Electric Company, Inc., and the International Telephone Sales & Engineering Corporation dated March 21, 1924.

With respect to Request No. 8: We produce first, an agreement between the Western Electric Company and the International Telephone Sales & Engineering Corporation, dated March 26, 1931, but inasmuch as this agreement refers to an earlier agreement and perhaps incorporates a part of its terms, we have also produced the earlier agreement between the two companies dated June 19, 1919.

With respect to Requests Nos. 9 and 11, referring to agreements between the Western Electric Company and Kellogg Switchboard & Supply Company and the Stromberg Carlson Telephone Manufacturing Company, covering basis of prices, we will have that information within a day or two and we will give it to you.

With respect to Request No. 10: We produce the following agreements between the Western Electric Company and the Kellogg Switchboard & Supply Company covering licenses and patent grants between the two companies covering the period between 1914 and 1930, both inclusive.

With respect to these agreements, I want to state for the record that so far as we have been able to discover, these are all the agreements we have, but the period inquired about is rather an extensive one, and I am not going to state on the record that there may not be other agreements which we may not have. These agreements are as follows:

One dated June 2, 1914; one dated August 3, 1923; one dated September 22, 1923; one dated November 16, 1923;

one dated January 26, 1927, and one dated February 9, 1927.

At the time Mr. J. E. Otterson was on the stand three requests were made of him to produce contracts and form [fol. 7837] of organization chart. I now produce in respect of Request No. 2, made of Mr. Otterson, an organization chart of E. R. P. I. which has been prepared in accordance with the agreement made with counsel for the defendants, so as to bring it down to date. It is in typewritten but not in printed form.

I also produce a form of contract between E. R. P. I. and Exhibitors of Motion Pictures;

Also a blank form of contract between E. R. P. I. and Recording Licensees;

Mr. Blackman: I have looked through this memorandum and there is only one thing on it that I think I will not furnish and that is the minutes of the meetings of the Board of Directors, A. T. & T. and the minutes of meetings of Executive Committee, A. T. & T. Those are Nos. 3 and 4 on page 7 of your memorandum, Mr. Adcock.

All the other things, I do not think there is any doubt about our furnishing. As you know, Mr. Bracelen has been ill for the past two days and I want to speak to him, because he has general control over the matter, but so far as I am concerned, I think we will agree that all the others will be furnished.

Mr. Blackman: I may say as to objections to materiality and relevancy, if there is any objection, they will be properly made, but no objection will be taken on the ground that they are not copies of reports put out by the company which purported to put them out. In other words, you will not have to prove that they were published in any particular journal or that that journal was published by the A. T. & T. or the Western Electric, as the case might be. There is one other thing I see here that I shall advise be not submitted. You are asking for all the publications of the Long Lines Division. I shall advise that that be not furnished.

EDGAR S. BLOOM, recalled:

I have read an article appearing in the Western Electric News, issue of January 1929, at page 326, about which article I was asked when I was on the stand before. This article correctly presents my views.

[fol. 7838] PIERRE W. SAXTON, recalled.

Direct-examination.

By Mr. Haight:

CR. 56, 58, 59, 73, 74, 75, 77, 78, 79, 80, 81, 82, 83, 84 and 85 have not been used. In 1923 there was a CR 68 which was entitled "Cash Estimate." In 1923 to 1926, inclusive, there was a CR-69 entitled "Advances, Bills Payable and Coupon Notes." In 1923 and 1924 there was a CR-70 entitled "Plant Purchased or Sold." In 1926 to 1930 there was a CR-93 entitled "Revenue Accounting Expense Report."

Provisional estimates of the Associated Companies are distributed, one copy to the official file, one to President Gifford, one to Mr. Heiss, one to Mr. Saxton, one to Mr. Behan, Uhrig, Andrew, Hamilton, Gherardi, Waterson, Wlodeck; five to Mr. Wilkinson, O. & E. Department, who is under Mr. Gherardi. Mr. Waterson is in Gherardi's organization.

I have forms of provisional estimates used by Illinois Bell for years 1919 to 1930, both inclusive. The instructions are contained in the forms themselves and appear as general notes on the back of the first page, and there are certain sheets in the estimate entitled "Explanation of Statements." I am referring to the form for 1919. I have not looked through all the forms.

I believe there is a letter of transmittal sent by the President of the company. The forms are transmitted to the presidents of the Associated Companies. I never heard of that letter referred to as the letter of instructions. Those letters are not sent out by our department. I think they are sent by the president, Mr. Gifford, and that letter is referred to as the letter of transmittal. There may be letters of instruction that come from various departments, or various staffs, referring to the manner in which these provisional estimates are to be made out, but I don't know. If there have been such letters, they have probably been sent by the department of O. & E.

The forms of provisional estimates produced were offered in evidence and marked Defendants' Deposition Exhibits as indicated below:

[fol. 7839] For the year 1919—Defendants' Deposition Exhibit 122.

For the year 1920—Defendants' Deposition Exhibit 123.

For the year 1921—Defendants' Deposition Exhibit 124.

For the year 1922—Defendants' Deposition Exhibit 125.
For the year 1923—Defendants' Deposition Exhibit 126.
For the year 1924—Defendants' Deposition Exhibit 127.
For the year 1925—Defendants' Deposition Exhibit 128.
For the year 1926—Defendants' Deposition Exhibit 129.
For the year 1927—Defendants' Deposition Exhibit 130.
For the year 1928—Defendants' Deposition Exhibit 131.
For the year 1929—Defendants' Deposition Exhibit 132.
For the year 1930—Defendants' Deposition Exhibit 133.

The Witness (continuing: In connection with my previous testimony I said that we prepared a combined provisional estimate for the Bell System including Associated Companies and Long Lines in general. As a matter of fact, the combined provisional estimate is for the Associated Companies only. The distribution of the combined provisional estimate is as follows:

One copy to the official file, one copy to Mr. Gifford, Cooper, Heiss, Saxton, Behan, Uhrig, Andrew, Hamilton, Cogan (he is in my organization), Gherardi, Waterson and Harrison (he may not have been identified—is in O. & E. Department); one to Mr. Anthony (also in O. & E. Department), Burcher (O. & E. Department); one to French (O. & E. Department); one to Crunden, assistant comptroller American Company; one to Wlodeck, Wilkinson and one to Mr. McHugh of O. & E. Department.

There is a form of combined estimate for the Associated Companies, which is a summary, which I have just referred to as distributed. That form has no number but it is simply a combination on the same form as are used by the companies.

Defendants request plaintiff to produce the combined provisional estimates for all the Associated Companies for each of the years 1919 to 1930, both inclusive, which request was taken under advisement.

[fol. 7840] Cross-examination.

By Mr. Blackman:

I know practically nothing personally of the operations of the New England Telephone Company. The reports of the company are kept in my department and aside from the reports that are sent periodically by that company to my division, I don't know anything about its income and invested capital and matters of that kind.

Redirect examination.

By Mr. Haight:

Those reports referred to, come to my division in the regular course of business and upon regular forms provided for that purpose. They are used by us for preparation of our own reports, such reports as I have already testified are made.

Mr. Blackman: Mr. Haight, in order to make this clear and to avoid any unnecessary further examination, I am not casting any reflection on the authenticity of the reports at all. My point is simply directed to this and I will make it plain on the record so that you will understand. In answer to a question by you the witness said he could refresh his recollection or refresh his knowledge of the income of the New England Company by examining the reports. I am making the point that he cannot refresh his recollection or knowledge because he never had any, that all he can do is to tell you figures that show on paper that is in his department.

Mr. Haight: All right.

JAMES F. BEHAN, recalled.

Direct examination (continued).

Mr. Mr. Haight:

Defendants' Exhibit 134 for identification is a tabulation showing the benefits to A. T. & T. resulting from consolidated income tax returns. At the bottom of the sheet is a statement "Notes, 1. Companies having deficits failing to pay dividends to the American Company." In 1918 there were companies who had deficits and did not pay [fol. 7841] dividends. The fact that no dividend was paid to the American Company is not taken into account in arriving at the figure of $196,286.17, which purports to represent the net amount of benefit to the American Company for the year 1918. The amounts shown on the sheet represent the savings to A. T. & T. without taking into account any loss to it as a result of the failure to receive interest or dividends from those companies. A distinction is drawn between the years 1918-23 and between the period 1923-30, inclusive, because our returns for the period 1918-23 are

closed with the Department at Washington, final settlement having been made. All of the other years are still open and still subject to discussion, so we don't know the final amount of taxes for those years.

In connection with the settlement for the years 1918 to 1923, we made additional payments over what had been paid originally, based on the return as filed.

Plaintiff's counsel refuses the request of defendants that witness produce the figures showing the additional payments for each of the years 1918 to 1923).

The additional payments were based upon the additional assessment for the consolidated group and the additional assessment, of course, could be allocated to the companies. We have made such an allocation to the various companies.

(Witness states that he will furnish subect to direction of counsel, statements showing such allocations.)

Each company that was involved in the additional assessment was billed for these additional payments. Some of them may not have been involved. As to whether the additional payments made by each of the companies in connection with their respective returns is reflected in the statement contained in Exhibit 134 for identification, I will say that the statement does not purport to reflect payments to the extent of the additional payments. It affects the final return.

The figure $196,286.17 for the year 1918, appearing upon the said exhibit, was determined by taking the final figure after audit by the Internal revenue department. To compute said figure, we took the final amount of tax which the A. T. & T. would have paid on an individual basis and deducted from that the amount of tax which it actually paid on a consolidated basis, and the difference is the benefit to [fol. 7842] A. T. & T. from the consolidation. We do not figure in such computation on any or all of the companies whose income we use in the consolidated income tax return, what each of the companies would have paid on an individual basis and what each of the companies was billed and paid on a consolidated basis. All we figure was the difference between what the American Company would have paid and what it did pay.

Defendants' Deposition Exhibit 134 for identification was offered and received in evidence as Defendants' Deposition Exhibit 134.

CLYDE UHRIG, recalled.

Direct examination.

By Mr. Haight:

With reference to bond discount and expense on the three issues I have mentioned in my original testimony, I was asked to make certain segregations, which I have done, and they appear upon Defendants' Exhibit for identification 135, entitled "American Telephone & Telegraph Company," etc.

I have here, in connection with CR-14, a document consisting of two sheets entitled "Cash Statement for years 1918 and 1919" which is marked Defendants' Deposition Exhibit 136.

I have the same CR-14 Report for the years 1920 and 1921 (2 sheets) which is marked Defendants' Exhibit 137.

I have also produced CR-18, consisting of a plurality of sheets covering the years 1919 to 1930, both inclusive, which is marked Defendants' Exhibit 138; also CR-10 for the years 1919 to 1930, both inclusive, which is marked Defendants' Deposition Exhibit 139.

(Said Exhibits 136-139, inclusive, were offered in evidence by defendants.)

The figures shown on CR-16 which I have produced, entitled "Final Cash Estimate December, 1919"—"Balance Nov. 30, 1919—$70,039,000" were estimated receipts for the month of December, 1919. I have no compilation or statement showing the estimated receipts by the classes shown on CR-16 for the entire year 1919. I probably have no com-
[fol. 7843] pilation, corresponding to these classifications.

I think we have a statement which shows the estimated receipts and the estimated disbursements for each of the years 1919 to 1930, but the subdivisions would not necessarily conform to those on CR-16. I would not say, however, we have estimated receipts and estimated disbursements by some classification for those years. An estimate undoubtedly was made, but whether it was preserved or not, I don't know. Doubtless we have sheets corresponding to CR-16 for each of the months for the years 1919 to 1930.

(Defendants' request that witness produce for each of the years mentioned, in the alternative, either a statement showing the estimated receipts and estimated disbursements by subdivisions, or produce the monthly reports

CR-16 for each of the months of each of said years, was taken under advisement by plaintiff.)

CR-13 is a report compiled in my department, which report is the Allotment Report.

(Request to produce Report CR-13 for each of the years 1919 to 1930, inclusive, taken under advisement.)

Mr. Blackman asked whether that was a report already furnished to defendants. Mr. Goldstein stated it had been furnished for inspection only and no copies could be made every time he got part of the information in Chicago.

The Witness (continuing): Defendants' Deposition Exhibit 140 received in evidence is a chart showing certain CR Reports that had once been in use and were no longer in use.

SEYMOUR L. ANDREW, for defendants:

Direct examination.

By Mr. Haight:

I reside at South Orange, New Jersey; I am chief statistician, A. T. & T. and I was thoroughly educated at Harvard College. I have been in charge of my division since 1921. My division furnishes advice and assistance in the development and prosecution of the statistical work of the accounting departments of the associated companies and of work related to that statistical work.

The words "Methods of Statistical Analysis and Pre- [fol. 7844] sentation" appearing upon the organization chart of my department—Defendants' Deposition Exhibit 51, refers to methods and we endeavor to assist the associated companies in the development of methods whereby the data in the underlying records may be most clearly, quickly and concisely made usable for administrative purposes of the Associated Companies. That work has nothing to do with the administrative purposes of the Bell System as a whole or the work of A. T. & T. except in so far as the methods may also be allocable to the work of the other departments of the general staff and are used by them.

The words "Statistical Methods of administrative control" relate to the administrative control exercised by all supervisors of the associated companies. It is not designed for the purpose of the organization of A. T. & T., and does

not relate at all to the administrative control exercised by A. T. & T.

As an instance of statistical methods of administrative control we have developed "Development of a job control book." That is, we suggest to the associated companies the form whereby statistical data may most readily be kept for day-to-day use by a supervisor in those companies. The development of the job control book is a continuing piece of work. I have forgotten when the start was made on that, but of course the need for statistical control methods and devices has become greater as the size of the system has become greater.

Job control means the control of the functions under the immediate direction of the supervisor, the object being, of course, so that every supervisor can have the statistical information relating to his job in the easiest and best form.

On the control charts, Defendants' Deposition Exhibit 51, there appear the words "Mathematical statistics," which relates to assistance rendered to the associated companies involving problems regarding the use of so-called higher mathematics. Such problems are not to any appreciable extent before me in connection with work of A. T. & T. as such, but we are asked occasionally by other members of the general staff for advice on problems involving higher mathematics. The work is not of a character where results can be sent. If there are problems that come up the general procedure would be to have the associated companies send [fol. 7845] some one in to discuss them. No reports are made as a result of such discussion. The general staff ask for information of the same sort on which we consult and give advice only as I have already said.

I am not, however, immensely familiar with other departments requiring mathematics. A number of them, of course, have their own mathematicians.

I cannot state how many representatives of Illinois Bell have come to my division for advice in relation to mathematical statistics since I have been in charge. We do not keep a record of that. I have no recollection offhand, but I might say that mathematical statistics is a very small fraction of our division.

In regard to which one of the topics appearing under my name, "Chief Statistician," on Defendants' Exhibit 51 represents the largest part of my division work, I would say

that the real classification of the functions of the division does not closely tie up with the particular language used in this chart. For example, the main function of the division is with reference to the development of statistical methods. Work of that character is carried on by each of the sections shown in these charts. Those methods do not relate to the making out of reports that go to the Associated Companies, but they relate to methods of summarizing, analyzing and presenting the underlying data of the associated companies for their own use. It does not include anything that relates to the making out of reports of those results to A. T. & T. I presume, however, that underlying data used in the making out of reports by associated companies to A. T. & T. is in some wise used. It, however, has nothing to do with the provision of the original data. It relates to methods of analyses and presentation of the data after it has been originally compiled. So far as I know, portions of it are presented in monthly reports to the A. T. & T.

Under the heading "Pension and Depreciation Studies" on Exhibit 51, we compute each year for each of the associated companies the proper accrual expense which they should charge to meet the undertaking to provide pensions in accordance with the terms of the pension plan of the Associated Companies. It relates to Long Lines but not to Western Electric or E. R. P. I. My division has nothing to [fol. 7846] do by way of cooperating or giving advice relating to pension funds to Western Electric. Nothing of a formal character. They provide their own accruals and compute them. I should not be surprised, however, if the people engaged in that work talked with our people from time to time.

Mr. R. W. Burgess, chief statistician of that company, worked out the Western Electric method. Our method was worked out in my division. I think both methods were worked out simultaneously. There was presumably cooperation of the character I have stated.

"Depreciation Studies" relates to the study of *of* those aspects of proper depreciation procedure which involves the use of mathematics. In the determination of service life of various classes of property the use of mathematical formulae and mathematical procedures are involved.

We have advised Associated Companies in respect to their use and appropriateness. In so far as the form con-

ceived by my division is applicable, they all use it. The form is applicable to those classes of telephone property for which experience as to service life is available. I don't know when that was started, but it was before 1929. I cannot tell when I recommended the use of formulas based upon experience. I cannot say as to whether it was after my original connection with my division. Of course our work in connection with recommending formulas upon the service life for the various associated companies is in the nature of research work. The recommendations go out by other people than ourselves.

As to the persons to whom recommendations go, we work with the proper people in the department of O. & E. as well as with the comptroller. We give them advice with respect to the mathematical processes involved. For example, studies were made in our division as to the type or types of mathematical formulae which might best fit the mortality experience of certain types of plant. Our conclusions as a result of those experiments and research along that line were forwarded to Department O. & E. and to the comptroller. That happened some years ago, I do not recall the exact date, but I will find out the date and let you know. That advice and the studies were based upon the experience of more than one of the associated companies, but I cannot say with exactitude as to the number.

[fol. 7847] At first hand I cannot say whether the formula based on service life that I have referred to, is now used by the Illinois Bell. As to the particular name by which the formula is designated, it seems to me that I have heard the name Gompertz-Makeham in connection with it. My impression is my division had nothing to do with the formulation of that law or formula, but in connection with that formula we undertook studies to determine whether or not it was applicable in the case of the mortality experience of classes of telephone property.

As to whether my division did work in computing the mortality of this property in the service on the basis of this formula, I will say that we were not after results. We were after methods of obtaining results.

As to whether we did anything else in connection with service life from the time I entered the division except what I have stated, I will say that I believe that members of the division have advised in respect of methods for determining service life where a formula of this character would not

apply. That is in those classes of property where this formula would not apply. I presume advice was given with respect to such classes of property. I do not remember what it was.

I cannot answer the question as to whether we made any studies or gave any advice in regard to the element of salvage relative to the subject of depreciation.

I do not think we used monthly reports of the associated companies in connection with any of these studies or recommendations that I made, but we did receive data as to the associated companies' past experiences with respect to certain classes of property upon which those studies were based. The reports used were in terms of physical units. I don't think we used any monthly reports of the associated companies that have been referred to as numbers 1 to 7, both inclusive, and number 28 or 22a, 22b, 22c, but I will check that and be certain. We do use in some of our work some of the C. R. reports in general relating to the associated companies and not reports relating to A. T. & T. We make use of the monthly reports of the associated companies for things other than depreciation.

In connection with our methods of work, we use monthly reports MR-1 to 7, both inclusive, MR-23, 22b, 22c and the [fol. 7848] special report on which CR-91 is based, but I do not think that advice and recommendations to the Illinois Bell and to O. & E. Department and to the other associated companies is based upon the above mentioned reports or upon studies based upon said reports. The reports enter into our work by keeping us advised as to the size and condition of each of the associated companies, which has a bearing upon the method which we may suggest to them as to the bearing. I will say that the methods which we might suggest for consideration in a small company would probably be somewhat different in detail from the methods suggested for use in a large company. In the way in which I have said, when we make determinations and give advice based upon studies, where that advice relates to the large companies we use the information from these various reports relating to such large companies. That is, the use that we make of them is not related to the advice that we give in respect to methods; in other words, to make that clear, we do prepare for certain officials and other members of the general staff of this department, some graphical presentations in which the data from those reports is used. In

the way that I have already stated, we do use in giving the advice the facts stated in the report from the associated companies relating to their affairs and the advice has some relation to the facts stated in the reports.

We use them in preparation and maintenance of certain graphic reports sent to other members of the general staff, the graphic reports going to Mr. Gifford, Cooper, Gherardi, Heiss and one or two of the members of Gherardi's organization. I presume my division gives advice or recommendations that are divisions of methods of what has gone before. In the same way and to the same extent as I have explained, those recommendations based on the same reports have the same relationship to the reports as I have already stated.

I don't know whether we use CR-52 entitled "Associated Operating Companies, including A. T. & T., Long Lines Distribution of Total Net Earnings for Month of —." I don't think we use CR-53A nor CR-54. As to CR-54A, I cannot be absolutely sure nor as to 67A. The only use, however, which we would make of any or all of such reports would be in connection with the making or posting of a few charts [fol. 7849] maintained for the other members of the staff, but I cannot say what if any use is made for that purpose.

My division has 115 employes. It does not have anything to do with the study of fundamental plans. We receive, however, copies of provisional estimates. We do not have anything to do with their preparation.

I think the heading on chart, Defendants' Deposition Exhibit 51, relating to the Comptroller's Department, relating to five-year budgets, is largely a misnomer. It was put there primarily for the purpose of having something over the name of the fellow that appears under each. We are in a little difficulty once in a while in showing coordinate members of the organization and then devising some title to apply to them. Of course in the field of general statistical methods is involved methods of estimating, and it is in connection with that, that that term is used.

Also on Defendants' Deposition Exhibit 51, there appears the heading "Economics Statistics" and under Mr. Belcher is "Financial Studies," which title appears above the name of Mr. Hodgkinson, Jr. That entire group is concerned with the study of current business conditions in the economic world outside of the telephone company. There again we have a case of two coordinate individuals in that

group and we call one of them "General Economic Studies" and the other "Financial Studies."

In connection with those we take certain periodicals and so-called economic service, but we do not use any manuals such as Moody's, Poor's and Standard Statistics in connection with them. It is quite possible occasionally that we do consult those manuals in connection with our work. Our library subscribed for them and they are available in the library for any one in the company who wants to refer to them, and I think they are referred to by people in my division, but I have never seen them in actual use, and I would not be apt to because if they are used they are used in a different office. We have a general library in the Comptroller's Department which is available for all of those who wish to consult any book in it, and books are consulted for the purpose of obtaining information. The use of the material by others in the company would indicate that the library serves a useful purpose and is worth what it costs. As to the useful purpose, I cannot say in detail. I can state [fol. 7850] the general philosophical conclusion but in my judgment it is desirable for persons connected with a large organization to have reasonably ready means of acquainting themselves or continuing to be acquainted with a fair amount of what goes on in the world outside of their immediate day-to-day job.

Referring to Defendants' Deposition Exhibit 51, under the heading "Chief Statistician" the first of the subdivisions is entitled "Industrial Surveys and Population Studies." That group advises the associated companies when called upon in relation to questions involving the present or prospective population in their territory and in respect of any studies which they may undertake looking toward an industrial survey, so-called, in any part of their territory or in the territory as a whole, those surveys being undertaken for the purpose of aiding the judgment as to what the probable future industrial development of those areas will be.

The subdivision headed "General Economics Statistics" concerns itself with the study of current and prospective business conditions outside of the telephone business and to furnish studies to the Associated Companies based on the results of these studies and with advice and assistance to the associated companies in their own study of business conditions in their respective territories.

The subdivision under the heading "Financial Studies" is engaged in the same character of work as the preceding subdivision except that it pays somewhat more attention to the study of banking conditions and security markets. In our studies of finances and conditions of the bond market and conditions of the stock market, etc., we use the services of Moody's, Poor's, Standard Statistics, but not the manuals. There are other services of that kind. We use those services and have the manuals in the library in my division.

Stipulated that the notary need not observe the order of December 4, 1931, requiring the depositions to be returned to the clerk of the court on or before February 1, 1932, but that it could be done later, on or before February 16, 1932.

Stipulated that original exhibits identified or offered on the taking of depositions, may not be returned by the Commissioner, but the exhibits may be used as identified when the depositions are offered, subject to defendants giving to plaintiff, on request, copies of any of the exhibits that they [fol. 7851] may desire, or giving them the originals.

Defendants' Deposition Exhibit 141, being a list of certain patents appearing in report of the Federal Trade Commission to Congress, entitled "The Radio Industry," received in evidence, subject to plaintiff's right to correct if errors are discovered.

Mr. Adcock: At the end of Mr. Otterson's redirect examination we requested the audits of Arthur Young & Company of E. R. P. I. which Mr. Otterson testified had been made by Arthur Young & Company and I think the letter of Mr. Bracelin of January 19th states, as a matter of fact, that there were no audits made and that request——

Mr. Bracelin: Did I say that?

Mr. Adcock: There were no reports made, yes, no reports made, and we wanted the audits made at that time, as stated by the record, in order to save time and for that reason we will probably want to recall Mr. Otterson to ask some questions about that situation, not particularly about the audits, but with reference to the subject-matter that would be covered by the audits.

Form of provisional estimate for year 1931 received in evidence as Defendants' Exhibit 133½, subject to plaintiff's objection as to materiality and relevancy.

With respect to Defendants' Exhibits 110 to 119, both inclusive, offered in evidence, defendants offer the following with reference to each one of those exhibits:

Exhibit 111—Prefatory note on page 3, chart appearing opposite page 7 and pages 7 to 28, both inclusive, not heretofore offered.

Defendants' Exhibit 112—Prefatory note on page 3, chart appearing opposite page 7, and all material appearing on pages 7 to 29, both inclusive, not heretofore offered.

Defendants' Exhibit 113—Prefatory note and chart appearing opposite page 8, and all the matter and material appearing on pages 9 to 29, both inclusive, not heretofore offered.

Defendants' Exhibit 114—Front and back of sheet 3, which is the sheet immediately preceding the table of contents and chart opposite page 5.

Defendants' Deposition Exhibit 115—Matter and material appearing on inside of cover page; material appearing on page following the cover page and all material appearing [fol. 7852] on pages 5 to 31, both inclusive, not heretofore offered.

Defendants' Exhibit 116—Material appearing on inside of cover page and material on sheet following the cover page and of pages 5 to 31, both inclusive, not heretofore offered.

Defendants' Exhibit 117—Material appearing on the inside of cover page and material appearing on page following the cover page and all matter appearing on pages 5 to 31, both inclusive, not heretofore offered.

Defendants' Exhibit 118—Material appearing on inside of cover page and material appearing on the page following the cover page, and all material appearing on pages 5 to 31, both inclusive, not heretofore offered.

Defendants' Exhibit 119—Material appearing on page following the cover page and all material appearing on pages 5 to 23, both inclusive, not heretofore offered.

The defendants offer with respect to each Defendants' Deposition, Exhibit 111 to 119, both inclusive, plaintiff objected on the ground of immateriality, irrelevancy and incompetency, but not to the authenticity of the documents.

HARRY H. CARTER, recalled.

Cross-examination.

By Mr. Blackman:

The Illinois Bell has done sales work in connection with Long Lines special service contracts for approximately a year, and sold during 1931 approximately $5,000 to $5,100 worth. The Long Lines' own sales force in that year did a million twenty to a million thirty-five thousand dollars worth.

About a year ago, Illinois Bell organized a group to sell their toll and special contract services and asked Long Lines to train that group, which was done under my supervision, sending a man to Chicago to train the group and work with them for a matter of a month or six weeks on one occasion; later, at Illinois Bell's request, man was sent there for 2 or 2½ months to carry on further work with the group.

Long Lines' sales organization that has been in Chicago for a number of years did all the selling of special services. However, if an Illinois Bell employe got in touch with some [fol. 7853] one who desired Long Lines special services, that fact would be reported to our sales organization and further negotiations would be carried on by it. Prior to a year ago, Illinois Bell had three people who were exclusively working on its special contract service sales. During the years Long Lines has had a sales force in Chicago, it has sold services for Illinois Bell which was done as a part of Long Lines own selling work. If we found people who were interested in Illinois Bell special services in addition to our own, Long Lines people would make the sales as the opportunity presented itself.

To sell special contract services requires a study of the customer's communication needs, and our studies sometimes would show that Illinois Bell special services were the only ones required. Sometimes a combination of Long Lines special service and Illinois Bell's were needed. In other instances Long Lines alone; that is, each of the two companies gave the same kind of service.

When I said at page 482:

"They can handle the applicant for service and can go to them and they can negotiate for sale of the service that he desires." I meant Illinois Bell Company's special contract services. The only services that Long Lines covers by con-

tract are special services shown on special forms. The forces of the Western Electric Company are included in the special sales campaign that I refer to.

The employes of the Illinois Bell are not really in a position to sell for us any services because to sell special contract services it requires a considerable amount of tactical knowledge, and the employe body of the Illinois Bell does not have that knowledge. Our sales are generally to very large concerns, such as banks, large manufacturing establishments, and the employe body as such would not have contact with the type of concern; so that the opportunities to sell special services are rather remote on the part of the employes generally.

The Illinois Bell would profit from the general sales campaign which I mentioned to a very considerable extent, because Long Lines employes and Western Electric are familiar with the various forms of exchange service offered by Illinois Bell and have contacts daily with their neighbors and friends who are likely prospects for additional services or new services entirely of Illinois Bell. It is comparatively [fol. 7854] easy for employes in Long Lines and in Western Electric because of such familiarity. Long Lines employes in Chicago are not really engaged in selling toll service because there is no contract taken for toll. Contracts are only in connection with special services. Toll service is promoted by advertising. The commercial employes of Long Lines at Chicago are on the Long Lines payroll. As to other employes in Chicago, I have not any direct actual knowledge as to whose payroll they are on.

The Long Lines Department has two continuing program special services furnished to the National Broadcasting Company and one to the Columbia Broadcasting Company. The National furnishes service to five stations in the Chicago area and Columbia to two stations in that area; so there are three program special services into Chicago over which broadcasts are sent to seven broadcasting stations in the Chicago area who are over Long Lines to the boundary line.

At the boundary line, the Long Lines plant and the plant of the Illinois Bell are connected, which extends to the studios of the broadcasting companies and from the studios the Illinois Bell's plant is used out to broadcasting stations. The Illinois Bell furnishes all the facilities required within the City. The Illinois Bell furnishes continuing program

special services to 14 stations in the Chicago area and no part of the Long Lines plant is used in that service, the Illinois Bell getting all the revenue and maintaining the service.

A continuing program special service is one furnished for any 16 hours continuously daily. Along the route of the facilities there are terminal rooms and repeater stations in which men stand by and observe the quality of the service, seeing to it that the lines and transmission levels are maintained and making all necessary adjustments and supervising to keep the program facility in condition to satisfactorily deliver the program to the radio stations.

There is also a temporary recurring service which is furnished so many hours a day or so many days a week or so many days a month, and in addition to that there is a service furnished for one time only—a half hour or an hour or a 2-hour basis, which is not a recurring service.

Long Lines has at the present time two recurring serv- [fol. 7855] ices going into Chicago and it has had on various occasions one time jobs where our plant is used to the city boundary and then connected to the Illinois Bell plant for the recurring service or for the one time service. The facilities and instrumentalities for the recurring service and for the 16-hour are the same and generally the same also for the one night. The Illinois Bell furnishes the facilities exclusively on service within the City of Chicago. Special services in Chicago with relation to aircraft operation, toll service and teletype service is furnished in co-operation with Illinois Bell, and Illinois Bell furnishes similar services without our co-operation.

Redirect examination.

By Mr. Adcock:

I have certain information that was requested by defendants with reference to revenue of Long Lines.

Defendants' Deposition Exhibit 142, is a statement covering period from July 1, 1919, to December 31, 1930, showing gross revenue from Long Lines business, together with the Long Lines' share in each case, subdivided first between revenue from message toll services and special contract services, and the latter services subdivided according to the various kinds of those services in effect in the respective years. The term "gross revenue" as used on this statement indicates the amount charged the users of the service.

However, the difference between this amount and the amount shown as the Long Lines' share does not represent the entire compensation to other companies for services and facilities furnished by them in connection with this business. To a very large extent compensation to them for facilities furnished is on a rental basis rather than on a pro rata basis. In such cases the rental payment is included in the Long Lines' expenses as a rent deduction. Similarly, compensation to other companies for operating services furnished by them are, to a large extent, reflected in the Long Lines' operating expense account rather than as charged against gross revenues.

Defendants' Exhibit 142 is a correct statement of the matters therein shown as taken from the books of A. T. & T. Defendants' Deposition Exhibit 143, dated January 1, 1931, is an organization chart of the Long Lines Depart- [fol. 7856] ment. During the 4½ years that I have been in Long Lines Department, there have been certain changes not only in personnel but additional offices. I refer to a commission going to the Illinois Bell in connection with Long Lines' special contract services. The Commission was accepted by Illinois Bell on June 30, 1930, and became effective July 1st of that year. There was correspondence between Illinois Bell and Long Lines on that subject, copies of which have been furnished us.

With reference to article in Bell System Technical Journal of January, 1930, entitled "Telephone Systems of the United States," to which Dr. Jewett's attention was called in his testimony, Dr. Jewett states as follows:

"I have reread the article prepared by Mr. Gherardi and me for the World Engineering Congress in Tokyo in October 1929 entitled 'Telephone Communication System of the United States' and reprinted in the January 1930 issue of the Bell System Technical Journal. I think that the article correctly portrays as of 1929 the material covered by it.

I think likewise that it correctly portrays the facts, statistics and forecasts as of the present day except only in so far as these have been modified by progress and developments that have occurred during the past two years or by the altered forward picture which has resulted from the changed economic situation.

Of course there are certain parts of the paper, particularly those relating to commercial and operational matters,

in which Mr. Gherardi's opinion is better than my own since they relate to matters with which he is more conversant than I.

While the paper undertook to give an accurate picture, as of 1929, of the telephone communication system of the United States, in a limited space, it must be read with an understanding of the occasion on which it was presented and the audience to whom it was presented.

The occasion was a World Engineering Congress called together for the purpose primarily of reporting on new and outstanding engineering advances in the period since the last preceding international congress. The audience to whom the paper was presented was composed of leading communication engineers from all the principal countries of the world.

Because of the nature and stated purpose of the Congress [fol. 7857] and the character of the audience, the paper which Mr. Gherardi and I prepared was not and was not intended to be, as regards the amount of space devoted to the various topics mentioned, an accurately balanced presentation of the research, development and engineering effort that had been or was being expended in the United States.

Since the development of purely local telephone service is involved with many purely local considerations, detailed description of one country's practice is frequently of little interest to the communication engineers of another country—for example, the vast problems of research, development and engineering involved in the introduction of panel type machine switching in the United States are only of general interest to communication engineers elsewhere in the world.

On the other hand, all communication engineers are interested in the problems of longer distance telephony and telegraphy, in international services and in the development of adjunct services.

For these reasons, and also because longer distance services have developed most rapidly, relatively, in the past few years and have involved more radically new things than strictly local telephone service, the portions of the paper dealing with these features of the communication system of the United States are more elaborate in detail than are the other portions of the paper."

Mr. Blackman: With regard to matter about which he was interrogated, Q. 191 and Q. 192, p. 319 of the record, Dr. Jewett states:

"I have read over Dr. King's article and I have no comment to offer, as I think it sets forth quite accurately the situation as it existed at the time it was written."

With regard to the matter about which Dr. Jewett was interrogated by Q. 196, record p. 322, Dr. Jewett states:

"I have read Dr. Osborne's article and have no comment to make. It sets forth correctly the general principles on which standardization in the Bell System is applied. The limited number of illustrations given are, I think, correct, as of the time the article was written and would today be modified only in detail, as a result of subsequent progress."

With regard to the matter about which Dr. Jewett was interrogated by Q. 197, record p. 323, Dr. Jewett states:

[fol. 7858] "I have read the marked parts on pages 545, 552, 553 and 554 of Mr. Pennock's article in the October 1925 number of the Bell System Technical Journal. The statements are in accordance with my general understanding, although I am not sufficiently conversant with the details of shop planning or shop operation to make specific comment on the accuracy of the figures used in Mr. Pennock's illustrations."

With regard to the matter about which Dr. Jewett was interrogated by Q. 205, record p. 329, Dr. Jewett states:

"I have reread the article which I prepared for the Western Electric News, the house organ of the Western Electric Company and which appeared in the issue of January 1919. I have also reread Mr. Vail's letter of December 11, 1918, to the Postmaster General and his letter of December 16th to Mr. Gherardi and me, which form part of the article. As a popular presentation of a new and highly technical development I think that the article is an accurate statement of the art as it existed at the time the article was written. A similar article and similar letters on the same subject, written at the present time, would undoubtedly employ different illustrations regarding the number of telephone and telegraph channels which it is economical to employ in multiplex operation and different and

much shorter lengths of line over which it is economical to employ them. This is because in the 13 years which have elapsed since the article was written very considerable advances have been made as a result of continued research and development work."

With regard to the matter about which Dr. Jewett was interrogated by Q. 205, record p. 329, Dr. Jewett states:

"I have reread the article 'The Engineering Department of the Western Electric Company' which I wrote for the June 1914 issue of that company's house organ, the Western Electric News. I think that this article, which was designed to acquaint the employees of the Western Electric Company with the general work of the Engineering Department, correctly represents the organization and work of the Engineering Department as it existed in 1914. There is, however, one sentence in the article which taken in connection with the preceding sentence is not strictly accurate. Thus sentence at the top of the second column on page 3 reads as follows: 'This service trial is under the direct supervision of *of* the American Telephone and Telegraph and Western [fol. 7859] Electric engineers and is designed, not only to make sure that no service conditions have been overlooked, but also to develop any points of mechanical weakness which may not have been discovered in the preliminary laboratory tests.

The statement is accurate so far as concerns the trial installation of developments undertaken in the interest of the Associated Companies. In the case of developments which were then undertaken in the interest of the non-associate business of the Western Electric, the American Telephone & Telegraph Company did not participate in the conduct of trial installations. In writing the sentence I presume I had in mind the fact that while a large percentage of the developments undertaken for Bell System use led to trial installations, only an occasional development for the non-associate business involved what were strictly trial installations."

With regard to the matter about which Dr. Jewett was interrogated by Q. 205, record p. 329, Dr. Jewett states:

"I have read Mr. Blackwell's article and have no criticism of any part of it as of the time at which it was written.

In his outline of the fundamental possibilities and limitations of radio, and in the problems involved in the development of it as a transmission means for electrical communication, the picture as I understand it today is essentially the same as that outlined by Mr. Blackwell in 1922.

In the ten years which have elapsed since the article was written there has, however, been a vast amount of development work done by large numbers of people in all parts of the world, with the result that the field of practical use for radio is today quite different from what it was in 1922. In particular, there have been improvements and refinements in the transmitting and receiving structures which have tended to increase not only the reliability of service under any given condition but likewise the range of distances over which such service can be given and the number of non-interfering channels which can be provided in any given part of the radio spectrum. More particularly, the developments of the past ten years have tended to widen very greatly the total usable width of the radio frequency spectrum, especially in the region of the shorter wave lengths. As Mr. Blackwell points out in his explanation of fundamental characteristics, this very considerable extension of [fol. 7860] usable frequencies at the higher end of the frequency spectrum serves not only very greatly to increase the non-interfering channel possibilities but also it tends likewise to a considerable reduction in the size and cost of the terminal structures.

With the very short wave lengths which are now being experimented with there appears also to be a possibility of employing radio economically over distances which a few years ago were thought to be entirely outside the range of economic utilization.

To the extent that the radio art has progressed very substantially in the last ten year period along the lines indicated, the situation for use as it existed at the time Mr. Blackwell's article was written has been materially altered."

Stipulated that Dr. Jewett if he was recalled would testify in accordance with statements read.

Defendants' Deposition Exhibit 144, being an allocation of additional income tax payments covering periods May, 1918, to 1923, both inclusive, and produced by plaintiff at defendants' request, offered and received in evidence.

Bond circular of Illinois Bell Company produced by plaintiff at defendants' request, offered and received in evidence as Defendants' Deposition Exhibit 145.

Objection by plaintiff to Defendants' Exhibit 145 on the ground of incompetency, irrelevancy and immateriality but concedes that the paper is a true copy of the bond circular issued and distributed in connection with the sale of bonds shown thereon.

CAJETAN MORSACK, recalled.

Cross-examination.

By Mr. Blackman:

At page 435 of the record I was questioned regarding the payments that the Long Lines made to A. T. & T. and I stated at the bottom of the page and at the top of the next page that there was certain work done by the General Department, A. T. & T., for the Long Lines for which the General Treasury was compensated, and I stated that that compensation was in the shape or form of 1½% of the Long Lines' revenue. In addition to those payments, for services performed by the General Department to the Long Lines [fol. 7861] as distinct from the services which apply generally to the various companies, the General Department bills the Long Lines for such services such as blue printing, photostatic, general duplicating work and drafting. Also proportionate part of the cost of auditing by Leibrandt, Ross Brothers and Montgomery, who perform the Company audit from the standpoint of the stockholders. They audit the Long Lines' books each year.

Long Lines also pays the General Department for proportionate part of the cost of conducting the General Medical Department. Pays rental to 195 Broadway Corporation, which is a subsidiary of the General Department. If the General Department furnishes any facilities, special apparatus, it would be charged to Long Lines. I have not any particular case in mind at the present time.

As to the instances that I have just mentioned, I thought of them in this way, that when I was asked the question originally, I had in mind services which are performed by the General Department not only for the Long Lines but for the various Associated Companies and not services per-

formed specifically for the Long Lines. When I was previously asked "Is there anything in addition to that?" meaning the 1½ per cent, and I answered "Not for general services so far as I know," that answer is still correct. These are special services.

The change in the basis for computing the license revenue charged against Long Lines was made in November, 1927, involving payment made in January, 1928. The compensation to the Illinois Bell for terminal loops paid by Long Lines is the same as Illinois Bell would charge an outsider for similar facilities, for example, for telegraph and teletypewriter contract loops, that is, $3.00 per month for the first mile or fraction and 75c per month for each additional quarter mile or fraction, $3.00 a month being the minimum charge.

The charge against the customer for the special contract service in which the loop is involved is a rate per mile per year, depending on the class of service and varying with the hours of service furnished.

As to whether there is a separate charge for loops by A. T. & T., as I understand it there is a charge for the drop. It is not specifically for the loop, but the fact that there is an additional drop connected to the service—I would say our commercial man would be better qualified to talk about this particular phase than I. I cannot quote the rates.

[fol. 7862] Monthly reports, Long Lines, Nos. 1, 2 and 14, covering the month of December for each of the years 1919 to 1930, both inclusive, produced, offered and received in evidence as Defendants' Deposition Exhibits 146 to 181, to which objection is made on the ground of incompetency, irrelevancy and immateriality.

Monthly reports, Long Lines, Nos. 3, 4, 7, 11 and 18 for month of December each year—1919 to 1930, both inclusive, produced. Monthly report No. 3, Long Lines, for month of December each year 1919 to 1930, both inclusive, consisting of 12 sheets, received in evidence as Defendants' Deposition Exhibit 182.

Monthly report No. 4, Long Lines, for month of December each year 1919 to 1930, both inclusive, consisting of 12 sheets, received in evidence as Defendants' Deposition Exhibit 183.

Monthly report No. 7, Long Lines, for month of December

each year 1919 to 1930, both inclusive, consisting of 12 sheets, received in evidence as Defendants' Deposition Exhibit 184.

Monthly report No. 11, Long Lines, for month of December each year 1919 to 1930, both inclusive, consisting of 12 sheets, received in evidence as Defendants' Deposition Exhibit 185.

Monthly report No. 18, Long Lines, for month of December each year 1919 to 1930, both inclusive, consisting of 13 sheets, received in evidence as Defendants' Deposition Exhibit 186.

And to the offer of said exhibits, plaintiff objected on ground of immateriality, irrelevancy and incompetency.

Monthly Reports, Long Lines, 22A, 22B and 22C and provisional estimates relating to Long Lines, reviewed by Report 22B covering the same period, asked by defendants to be produced, refused by plaintiff.

[fol. 7863] DANIEL C. COLLINS, for defendants:

He was comptroller for E. R. P. I. and was called to testify with reference to Defendants' Exhibit 187, entitled "Condensed Summary of Results for the years 1927 to 1930, inclusive, monthly report No. 1," and after having stated that the statements on the report were correct, he also stated that the information contained on Defendants' Exhibit 189 was compiled from reports of E. R. P. I. sent to Western Electric, Defendants' Exhibit 189 being a condensed summary of summaries from said reports to Western Electric.

[fol. 7864] Inasmuch as plaintiff agreed to furnish the break-down of certain items on said exhibit satisfactory to defendants, and as such break-down has been furnished, it is unnecessary to abstract the testimony of Mr. Collins further.

CAJETAN MORSACK, recalled.

Redirect examination.

By Mr. Goldstein:

All I know about the occasion for the enlargement of the base for license payments by Long Lines Department to the General Department, effective January, 1928, is that it

came about in connection with the decrease in the rate used for licensee contract payments coincident with the transfer to the Associated Companies of the instruments. It increased the number of accounts to which the 2 per cent became applicable.

In connection with Defendants' Deposition Exhibit 142, it was stated that the difference between the gross revenue (for Long Lines) and the Long Lines' share does not represent the total payment made to the Licensee Companies by the Long Lines Department for their respective facilities used in connection with the services from which these gross revenues were derived. It was also stated that payments were made by the Long Lines Department in two ways, one by reimbursement of labor performed for the Long Lines Department by the licensee companies, and, two, by rental payments for the use of plant of the licensee companies.

There is a contract between the licensee companies and the Long Lines for the distribution of Long Lines toll message revenues. The license contract provides that the revenues will be divided pro rata according to mileage haul furnished by each company. That arrangement has been in effect since the license contract has been in effect. It has not been in effect, however, with reference to Chicago. The arrangement with respect to Chicago is more favorable to Illinois Bell with respect to the City of Chicago. The arrangement with the Illinois Bell is on the basis of reimbursing it for cost to it of furnishing all plant and facilities in the City of Chicago used in connection with Long Lines' business, plus a return of 10 per cent on the investment in the plant which the Illinois Bell furnishes, which is without [fol. 7865] deducting depreciation reserve; that is, 10 per cent of the book investment.

That arrangement has been in effect since 1911. I think the City of Chicago is the only city in the United States where this special arrangement prevails. That arrangement still prevails at Chicago.

The arrangement with respect to special contract services varies for different companies. With most of the companies' compensation for the facilities furnished by the Associated Companies in connection with special contract services is on rental basis. That does not apply in the City of Chicago, however. In Chicago, the compensation which I have described applies regardless of the use made of the facilities.

R. D. Q. 170. So that the distinction between the City of Chicago and the rest of the country is this: That in the City of Chicago the Illinois Bell is compensated by a reimbursement of the expenses of operating the Long Lines plant——

Mr. Blackman: No, not operating the Long Lines plant.

The Witness: I have not talked of operating. I have talked of facilities.

R. D. Q. 171. All right; is reimbursed for depreciation and maintenance of the Long Lines plant?

Mr. Blackman: Wait a minute. He didn't say anything about Long Lines plant. He is talking about the Illinois Bell plant.

Mr. Goldstein: You see, the Illinois Bell owns the title to all the plant in Chicago.

Mr. Blackman: Certainly.

Mr. Goldstein: And it is designated as the Long Lines plant, that is, because that portion of the Illinois plant is used exclusively in the Long Lines business.

Mr. Adcock: You mean the Illinois Bell Long Lines plant?

Mr. Goldstein: Yes.

R. D. Q. 172. That is correct, isn't it?

A. That is correct, except that some of it is not used exclusively in so far as the toll message is concerned.

R. D. Q. 173. Where it is not used exclusively, you apportion it?

A. That is right.

So that as to that portion of the plant of the Illinois Bell Telephone Company in the City of Chicago, which is used exclusively for the long distance business of the American [fol. 7866] Telephone & Telegraph Company, or that portion of jointly used toll plant which you apportion to the Long Distance business of the American Telephone and Telegraph Company, the Illinois Bell is reimbursed, or is paid, an amount which covers the depreciation and maintenance of the plant plus a return of 10 per cent on its book cost without deducting the depreciation reserve, plus administration, taxes and all of its charges in connection with that plant. The situation today is the same as it was before. With regard to special contract service revenues there are no additional payments out of those revenues to the Illinois Bell. They get their costs plus 10 per cent. We are speaking entirely of facilities. The old arrangement still

prevails as to reimbursements for the employees' labor and commissions, just as it existed before. There has been no change in principle in the City of Chicago since 1925, as far as the long distance service is concerned. There has been a change in respect to paying commissions on special contract services.

The commission arrangement which I stated went into effect on July 1, 1930, applies to the City of Chicago as well as other cities, so far as special contract services are concerned.

Our special contracts are usually designated as services, that is, a subscriber may have a given service number, a contract calling for a wire between New York and Milwaukee, let us say, with patrons connected at Philadelphia, Pittsburgh and Chicago, so there may be two or three in Chicago on that same wire. If it is a two-way service, that is, providing for communication in both directions rather than in only one direction, then on a contract the monthly charge against the customer is between $2,000 and $4,000 per month; on a full talking or short period talking contract the Illinois Bell would receive as commission for each station in the City of Chicago or at any other point in its territory connected with that wire, $16.00 commission from Long Lines. That would come out of the $2,000. I don't know how the $16.00 commission was arrived at. $16.00 is in addition to $3.00 a month mentioned. I don't know how long the $3.00 minimum charge for loops has been in existence. I should say at least ten years.

The rental basis is arrived at I think as follows: For a particular associated company's territory, we take all the contracts in effect at a given time and make a study of the [fol. 7867] revenue of the total mileage involved, thus deriving an average revenue per mile. From that we deduct the costs of operation, including commissions, which are paid to the Associated Companies for work which they do in connection with these contracts, and it is then brought down, that is, deducted from the gross revenue, so that it might be called a sort of net, although it is not a final net, and that figure is used.

Referring to Defendants' Exhibit 142, portion allocated to Chicago is not on the basis of revenue but is on the basis of the facilities and service. I do not see how it is possible to determine what portion of Long Lines' gross revenue comes from the City of Chicago so far as special contract servi

is concerned. It is not possible to show how much toll revenue originated from stations located in Chicago because there is no originating or terminating point there. We do know that in the large cities we have more subscribers for special contract services than in the smaller cities, but we never have made any special study for comparison. I don't think it can be done.

HARRY H. CARTER, resumed.

Redirect examination.

By Mr. Goldstein:

Long Lines Department makes sales of service for the Illinois Bell and the Long Lines does not participate in any of the revenue of the sales. Prior to last year there were no records kept as to the magnitude of such sales; from 1931, because of new interest in sales generally, there are certain reports that have been made in Chicago which have attempted to allocate the selling between the two organizations, that is, Long Lines and Illinois Bell. In the last year such reports show $5,100 worth sold for us by Illinois Bell and we sold for them about the same amount.

There are other records of miscellaneous items of exchange services sold by Long Lines, and the Illinois Bell is going to summarize those results, but either way it would be a comparatively small amount. For example, A. T. & T. makes a contract for special contract services going outside of Chicago and in connection with that service loops are used, which loops are furnished by Illinois Bell. We include in the charge to the customer the amount of money that we [fol. 7868] paid to the Associated Companies for loop facilities. The amount of money which the Illinois Bell charges us for the loop is included with the charge for the rest of the service that we bill the customer. It is not shown as a separate item.

(For deposition of Edwin F. Carter, see Abst. Vol. III, pp. 821-833.)

PUTNAM W. SAXTON, recalled.

Redirect examination.

By Mr. Adcock:

Provisional estimates that come from the Associated Companies are sent to the president of A. T. & T. They

are photostated by Mr. Behan's division. I don't know to whom they are distributed. Mr. Behan distributes the provisional estimates.

CR-13 for December of each year, requested by defendants, refused by plaintiff. Plaintiff also refused defendants' reque for Quarterly Report 7-A as to the Bell System, Long Lines and Illinois Bell.

CAJETAN MORSACH, recalled.

Recross-examination.

By Mr. Blackman:

With reference to redirect questions 196 and 197, I understood the questions to apply to facilities used in connection with Long Lines service other than those in the City of Chicago. With respect to the City of Chicago, the Illinois Bell receives for the facilities and services furnished by it in connection with Long Lines business, a share of the revenue from that business equal to amounts as follows:

First, on message business for each message and report charge originating in the City of Chicago, Illinois Bell receives a commission of 12c; also for each paid message and report charge, it receives an additional amount of 5c for use of trunks and recording services and facilities; for the use of central office and outside facilities, it receives the cost to it of furnishing such facilities, plus a re- [fol. 7869] turn of 10 per cent on the book investment; for operating services furnished in connection with this business, it receives the cost to it plus 10 per cent; on 2-way special contact services, it receives commissions in accordance with schedules heretofore mentioned, this commission having been effective July 1, 1930.

Any amount which Illinois Bell must pay to the American Company as licensee revenue with respect to the share of revenue it receives for these various services and facilities, is considered as a cost to the Illinois Bell and is allowed to Illinois Bell by the Long Lines.

. . . . . .

[fol. 7870]

Oral Evidence in Toll Rate Case A. U. R. P. No. 124

[fol. 7871] BEFORE PUBLIC UTILITIES COMMISSION OF OHIO

Advanced Utility Rate Proceeding No. 124

In the Matter of the Proposed Increased Rates and Charges of THE OHIO BELL TELEPHONE COMPANY for Telephone Service Between Points in the State of Ohio, Filed on December 21st, 1923, to Become Effective January 21st, 1924

Statement of Evidence

Proceedings before Honorable Charles C. Marshall, Chairman, Geo. T. Poor and Frank B. Maullar, Public Utilities Commissioners, commencing Thursday, February 7th, 1924

APPEARANCES

Messrs. S. H. Tolles, Karl E. Burr and C. S. Maltby, on behalf of The Ohio Bell Telephone Company.

Mr. F. N. Dotson, City Solicitor, on Behalf of The City of Toledo, Ohio.

Mr. John M. Lewis, on Behalf of the State Citizens Association of Ohio.

Mr. U. G. Danman, on Behalf of The Toledo Wholesale Coal Trade Association.

* * * * * * *

[fol. 7872] And also FREDERICK LELAND RHODES, called as a witness, on behalf of the Ohio Bell Telephone Company, being duly sworn, testified as follows:

Examined by Mr. Burr:

Q. Will you state your name, your residence and occupation?

A. Frederick Leland Rhodes; 53; I live in Short Hills, New Jersey, about twenty miles from New York City. My office is in New York City, and I am Outside Plant Development Engineer for the American Telephone & Telegraph Company.

Mr. Burr: For the sake of brevity, the American Telephone and Telegraph Company will be hereafter referred

to as the American Company, if there is no objection, and the Ohio Bell Telephone Company as the Ohio Bell Company.

Q. With what understanding, I will ask you, Mr. Rhodes, how long you have been connected with the American Company?

A. 32 years next June.

Q. What engineering training and experience, if any, have you had?

A. I graduated from the Massachusetts Institute of Technology in 1892, receiving the degree of Bachelor of Science in Electrical Engineering.

I immediately after graduation entered the employ of the American Bell Telephone Company. I was continuously with that company up to the year 1900, when the American Telephone & Telegraph Company took over the work that had been previously performed by the American [fol. 7873] Bell Company, and since that time I have been in the employ of that company. My early work for a number of years was assisting more experienced men in the business, really learning something about my job. After the beginning I was frequently detailed to assist associated companies in the field. Therefore, I had an opportunity to become familiar with telephone plants and telephone construction in many parts of the United States. My work has covered various parts of the telephone plant, underground systems, underground and aerial cables, pole lines and their accessories, wires, and to a considerably less extent, buildings, central office equipment and sub-station equipment.

In 1905 I was placed in charge of a section of the engineering department of the general staff, having charge of the development and standardization of construction materials, methods, apparatus and practices used in the outside plant of the telephone system.

In 1909 I was appointed outside plant engineer, reporting to the Chief Engineer, and continued responsible for work of the character I have just described. That has covered the preparation of many hundreds of specifications, covering in full detail all of the requirements necessary to secure the best results in the outside plant, and it has covered a large amount of research work, laboratory experiments, field trials and tests of a physical, chemical

and structural nature of the materials used in the outside plant. To some extent it has covered maintenance and [fol. 7874] standards, and it has included important improvements and economies in the design and use of telephone cables. It has covered work on the most economical bases of designing the outside plant, to some extent the relation of the telephone wires to high tension light and power wires, in order to keep the telephone lines quiet and safe. And it has comprehended a constant examination of new ideas from every available source pertaining to my end of the work.

In 1919, for purposes of more effective administration, there was a separation made of the then engineering department into two departments, separating the development and research work from the strictly engineering work. The two departments are known as the Department of Development and Research and the Department of Operation and Engineering. And I became Outside Plant Development Engineer in the Department of Development and Research, reporting to Vice President General John J. Carty.

Q. You are now so engaged?

A. Yes, sir.

Q. You referred in your answer to the associated companies. In brief, what are the associated companies? I do not mean necessarily their names, but what do you mean by the characterization "Associated companies?"

A. They are the companies, like the Ohio Bell Company, which are concerned in giving telephone service in the sections of the United States where they operate. The entire United States is covered by about 25 associated companies, each one of which operates within its territory. [fol. 7875] Q. With what engineering societies or committees are you now or have you been associated?

A. I am a fellow of the American Institute of Engineers. The Institute has three grades of membership, associates, members and fellows. There are about possibly six hundred fellows out of a total membership of about 15,000.

I served for five years on the Board of Examiners of the American Institute, for two years as Chairman of the Board. For one year I was Chairman of the telegraphy and telephony committee, and I — now a member of the Standards Committee, and also of the Executive Committee of the Standards Committee.

Since 1913 I have been a member of the American Electrolysis Committee.

Q. Of the Institute?

—. No, that is a committee of a number of National Organizations, such as the National Electric Light Association and the American Railway Association and the American Electrical Railway Association, the American Water Works Association, and a number of other interests, which are either concerned with underground structures which are likely to be damages by electrolysis or which operate systems which produce electrolysis. The aim of the committee is to determine the best methods for minimizing and mitigating the effect of electrolysis.

I am also a member of the American Engineers Standards Committee, and of the Executive Committee of that Committee.

In the past year I have served on the Committee of [fol. 7876] the Railway Telegraph Superintendents' Association, dealing with the matter of standardization of construction for wire crossings over railroad rights of way.

And I have been a member of the National Joint Committee on overhead and underground line construction, and on a committee co-operating with the National Bureau of Standards in formulating the National Electric Safety Code. And some others.

Q. What papers or articles, if any, have you written on telephone subjects?

A. In co-operation with another member of our Company, I prepared an article on the telephone, quite a lengthy article, for the 1920 edition of the Encyclopedia Americana. I have also personally written the article on Telephony in Nelson's Loose Leaf Encyclopedia, which is another American Encyclopedia. And I prepared an article on Telephone Development in America for the Past Ten Years for the supplementary volumes to the Eleventh Edition of the Encyclopedia Brita-nica. And then I have also written technical articles on telephone subjects for the American Institute of Electrical Engineers and a number of Articles in purely telephone publications.

Q. I believe you are a member of the General Staff of the American Company. Will you tell the Commission, if you please just what is meant by the term, "General Staff?"

A. We apply that term in the Bell System to the large con-

tral organization of experts on all phases and angles of the telephone business, which is maintained by the American [fol. 7877] Company for the purpose of developing the art of telephony by means of scientific research and also rendering advisory and consulting services to the associated companies of the Bell System, in every branch of the telephone business.

Q. What was the state of the art, if you know, in the early stages of the telephone business, how was the origin of the General Staff related to it, and briefly, what was the connection between the two?

A. Well, at the very beginning of the business, immediately after the invention of the telephone by Alexander Graham Bell, Doctor Bell and his assistant, Mr. Thomas A. Watson, were the only people that knew anything about the telephone. And I think that is rather an interesting thought, that there was nobody anywhere in the world that they could turn to to teach them anything about the telephone business. There wasn't anyone else anywhere that knew anything about it. The whole art of telephony had to be developed.

In the beginning there was a laboratory where Bell and Watson worked. Mr. Watson was shortly placed in charge of that laboratory, and that was the germ, the beginning, of the technical organization which has grown into the present general staff.

The early situation was marked by the crude character of the instruments and their lack of power and their short range. In fact, in the beginning, the telephone instrument was regarded as pretty much of a toy. There were no means for signalling, no means of calling a called subscriber [fol. 7878] to his telephone. There were no telephone switchboards, and there was a great lack of knowledge as to how to build telephone lines. The relatively imperfect telegraph lines of that era were the only lines that it was known how to build. As soon as people undertook to use the telephone they ran into a great many difficulties. They found difficulties from overhearing from one line to another. You could hear just about as well on a circuit adjacent to the one you were talking over as you could over the one you were supposed to be talking on. There were inductive disturbances on the line that came both from neighboring telegraph circuits and some atmospheric disturbances. The

facts of the matter were that the telephone art was almost totally inadequate at the time it was attempted to interest people with capital in different parts of the United States in the introduction of the instruments.

The method that was adopted in the early days was to grant licenses to individuals and firms throughout the United States and there were many hundreds of those licenses granted. Each licensee had the exclusive rights in his own territory. They had to operate the best way they could. They were financially weak and they were technically weak. They had the exclusive use of these instruments in their territory and with that they got the services of this General Staff and what they did was the natural thing to do. When they got into these difficulties in operat- [fol. 7879] ing, why they came back to the American Company and they said, "We have these difficulties. Now, what shall we do to overcome them? We have got our license, but we cannot operate our telephones." So the Staff undertook to help them, and they did from the beginning.

They were also confronted with other questions besides the electrical ones, the questions of accounting and administration and methods of operating, and they turned to the Staff, which was broadened from time to time to be in a position to advise them. So I think it is clear that the growth of this General Staff as a means of furnishing assistance to the associated companies has been a natural one. It was a matter of evolution, growing out of the character of the business.

And rather significant in that connection is an old letter that we have in our records that was written in 1879, June 26th, by Mr. Theodore N. Veil, who was then the General Manager of the predecessor of the American Company, the National Bell Telephone Company. It was written by him to Mr. Pope, who represented the associated company in New York. It is very brief and with your permission I will read it.

"Dear Sir:

Before putting any exchanges or starting in or even planning for a central office system, I think it would be well for you to consult thoroughly with Mr. Watson and examine minutely into our standard systems for central office communications. What we want to do in every case is to adopt [fol. 7880] the best system, and that we think we have. Then

if there is anything better we should, of course, want to adopt that. Please let me hear from you in regard to this."

Now, the spirit shown in that letter of wanting to advance the art and put in the best thing, has been characteristic of the Bell system from that time on.

I have photostats of that letter if you care to have them.

Mr. Burr: Let it be marked Rhodes' Exhibit No. 1, and we offer it in evidence. There are extra copies, although hardly enough to give to everyone in the room. Would the Commission like to have copies of the Exhibits handed to them as they are offered in evidence?

Mr. Maltby: They should be.

Chairman Marshall: We ought to have one set at least.

And thereupon the photostat copy of the letter above referred to was marked for identification and offered and admitted in evidence on behalf of the Ohio Bell Telephone Company, and is herewith submitted, marked Rhodes' Exhibit No. 1, and made a part hereof.

Q. Mr. Rhodes I have been asked whether the letter offered in evidence as Rhodes' Exhibit No. 1 is a facsimile of the original letter.

A. It is a photostat from a photograph of the original. The original letter is in the office of our President in New [fol. 7881] York.

Q. Yes.

A. Now, I spoke of the original Bell instrument, and I brought along a model of Bell's first telephone, which is a duplicate of the instrument through which speech sounds were first transmitted electrically in 1875. It consisted of a stretched piece of parchment, to which was attached a little Reed, which was connected with a magnet, on which was wound the operative coil, and that was the beginning of our telephone instruments. I have photographs of that, Mr. Burr, too.

Mr. Burr: May it be understood that photographs of the instrument just referred to by Mr. Rhodes, as well as photographs of the other telephone apparatus to be covered by his subsequent testimony may be offered in evidence and made a part of the record in lieu of the instruments themselves?

Mr. Dotson: There is no objection.

Q. Is the photograph, which for identification may be marked Rhodes' Exhibit No. 2, a photograph of the telephone instrument just described?

A. Yes, sir.

Mr. Burr: We offer Rhodes Exhibit No. 2 in evidence.

And thereupon the photograph above offered was admitted in evidence on behalf of the Ohio Bell Telephone Company, and is herewith submitted, marked Rhodes' Exhibit No. 2, and made a part hereof.

[fol. 7882] Q. Mr. Rhodes, in order to cut the inquiry as short as possible, when I am inter-ogating you as to the photographs, I will leave out the words, "A true and correct representation," and merely ask you if the photographs are photographs of the Exhibit referred to, and it will be understood that your answer intends to mean that they are not only photographs, but true and correct representations.

A. That *Is* what I have undertaken to do,—Now, this instrument was followed by some more compact ones, the ancestors of the present telephone receivers that hang on the hooks of our sets; and in the very beginning two of those telephone receivers, one of which was used to talk into and the other to listen, alternately, with a short piece of wire connecting them, constituted the entire telephone piece at the beginning. And at that time you could put the whole telephone plant in the world in your pocket. From that beginning the great public service of today had to be created. And back of that service the telephone art had to be developed. There were no microphone transmitters, there were no call Bell devices to call the subscriber to his telephone, there were no switchboards, in fact, there were none of the thousands of parts now essential to a modern telephone system.

From the beginning the American Company undertook to develop the telephone art and to furnish information and advice to the associated companies. The furnishing of these services has required a Staff of technically skilled men, and as the art has broadened, this technical staff has [fol. 7883] grown, in response to the ever increasing complexity of the telephone business, and the furnishing of these services by this centralized staff has clearly been the best and most effective and the most economical way of making the Bell invention useful to the public. And I think it is a con-

rect statement to say that the universal service that we have in the United States and the telephonic supremacy of the United States over the rest of the world has been largely due to this arrangement. It is the duty of this staff to anticipate difficulties and to originate improvements in advance of the needs of the associated companies, so as to always have ready for their use carefully tried out apparatus and methods in advance of the time when by their growth they are confronted with the need for these things. As a result of that the associated companies, like the Ohio Bell Company, have not been required to undertake themselves broad technical development, research and standardization, because the American Company through its General Staff had done that work for them.

Now, in addition to the improvements which this staff originates itself, it is continually on the lookout for good ideas that originate itself. We have not made all of the improvements that have been made in the telephone business, and what we attempt to do is, if an improvement is made elsewhere, to acquire rights so that they will be available for the associated companies. And it makes no difference where a good idea comes from, whether it comes from [fol. 7884] the General Staff itself or from an associated company or outside the Bell system, we take it up and test it and if it is worthy, it is made available for the Ohio company and the other associated companies. All general scientific discoveries in this country and abroad are followed up and studied, and where they contain the possibility of improvement in the plant, the ideas are developed for application and made available to the associated companies.

New ideas rarely come at the beginning in completed form. They must be developed and worked into shape, and the aim of the Staff is to make available whatever there is in the art of telephony that is good for the associated companies. One phase of the work of this organization consists in bringing together ideas from all sources, good, bad and indifferent and elliminating the bad and the indifferent and making the good available for the entire system.

Q. Is the General Staff of the American Company divided into departments, and, if so, will you please give the names of the departments?

A. Yes, it is. The principal departments are the Department of Development and Research, the Department of

Operation and Engineering, the Department of Accounts and Finance, the Legal Department and the Information Department. There are other departments dealing with matters of personnel and with matters of relations with other companies. In order to make that division into departments and to show the functions of the departments more clearly, I have prepared a diagram showing these functions.

[fol. 7885] Mr. Burr: It may be marked Rhodes Exhibit No. 3, and we offer it in evidence.

And thereupon the diagram above referred to was marked for the purposes of identification and was offered and admitted in evidence on behalf of the Ohio Bell Telephone Company, and is herewith submitted, marked Rhodes' Exhibit No. 3, and made a part hereof.

Q. That is the diagram you refer to?

A. Yes, the diagram I refer to I now hold in my hand.

Q. What is the total number of employees in the General Staff, if you know?

A. Yes, I do. That is, I can give you the number as of December 31, 1923, the end of last year.

Q. That will be sufficient?

A. There were then 1,824.

Q. Now, will you please describe the principal functions of those several departments, explain what it is that they do, beginning, if you please, with the Department of Development and Research? And may I ask you at this point whether, if at any point in your testimony or on exhibits there appears the letters "D" and "R", they refer to the Department of Development and Research.

A. Yes, that is right.

Q. Now, will you please describe the functions of the several departments, beginning, as I say, with that of Development and Research?

A. On this diagram I have endeavored to show, first, the two divisions of the service under the license contract, which I have divided, as appears at the top of this sheet, between [fol. 7886] the advisory, consulting, financial and general services, and what we term the instrument service. The instrument service I have shown at the extreme upper right-hand corner of the sheet. The rest of it is a presentation of the kind of work that these different departments perform. Now, under the section of this diagram devoted

services appears on the lefthand portion of the sheet a sort of an organization diagram or tree, which shows the functions of the Department of Development and Research.

This department as its name implies, conducts the development and research in connection with the new systems, apparatus or materials required in use in the plants of the associated companies. And in an art so rapidly changing as the telephone art, with such complex problems as it involves, the development and research work is a matter of great importance, and it is also of great importance that it should be organized. Our most recent important improvements cannot be credited to individual workers. There are large groups of engineers and scientists who are engaged on these problems or portions of the work assigned to each.

Q. You mean engineers and scientists who are members of the Department of Development and Research?

A. I do. I will go into that at greater length later on, describing the composition of the departments.

Q. I wanted to make sure you were not referring to outside scientists who were not members of the Staff?

A. No, I am referring to its organization, and from time [fol. 7887] to time we have found it advisable to retain outside men who are specialists in some particular subject, but this is work that is done directly in connection with furnishing these services. I made this point in regard to the organized development, and research work, because it is by that organized team work that the advances which the future holds in store will be made, and the recent advances have been made in that way. I think with what I shall say later and what is said on this chart that that makes pretty clear the general nature of the development and research work.

Now, the department shown at the right of that is the Legal Department, which furnishes the associated companies with compilations of reports and decisions, and also acts as legal specialists on all points connected with the telephone work who are available for consultation with the counsel of the associated companies.

I have shown on this Legal Department also some notes on the subject of patents. The telephone art is a relatively new art, less than 50 years old. The inventor of the telephone, Doctor Bell, died only a year ago last summer, and his immediate assistant at the beginning, Mr. Thomas A. Watson, is still living. I mention that to show the relative

newness of the art itself. Now, in that period of fifty years it has, of course, undergone rapid development, and that has meant many inventions. The telephone art is largely a patented art, and there are many patents covering the systems which the associated companies are now using. [fol. 7888] Q. Do you cover the number of patents at a later point?

A. I will, yes, or I can tell you now, if you wish.

Q. All right.

A. I might lead up to it perhaps. The American Company undertakes that rights will be acquired under all patents that are necessary to afford a field permitting the free development of the art along the lines that make for efficiency and economical service. Now, to that end the patents of the Bell system are held by the central organization and they are available for the benefit of all of the associated companies and the associated companies are charged no royalties for the use of patents. That comes under the license contract arrangement.

The associated companies do not have to concern themselves with patent matters, and a company like the Ohio Bell Company has nobody on its payroll who is looking after patent matters for it, despite the fact that they are using a large quantity of patented apparatus. The reason for that is that under the license contract the American Company guarantees the associated companies against patent litigation, and undertakes to carry it on for them whenever it arises, and the patent department of the American Company also sees that such steps as are necessary are taken, so that adequate patent protection is secured on all new developments, in order that the associated companies may have the free and unobstructed use of these things.

Q. Right at that point, Mr. Rhodes, if I may interrupt you, does the American Company by means of these patents [fol. 7889] undertake to exclude everyone else from the use of the patented article, or is the possession of the patents more intended as you say to insure the free and unobstructed use of the patented article to the associated company?

A. It is the latter, and in a number of cases other interests have sought to make use of some of these devices, and in some instances they have been granted the privilege of making use of them. The purpose of acquiring these patents is not to prevent other people from using these thing

but to maintain open for the Bell system the right to use them.

Now, there is a point right there that I would like to explain and that is, when we are undertaking a new development, we cannot tell at the beginning of the work what line that is going to take. There may be five or six different ways in which this new result is sought to be accomplished. We have to obtain patent protection, so that we can follow whichever one of these five or six channels works out in the end to be the best and the most advantageous. So we have to acquire rights that will permit us to do the thing that is it is best to do as the development progresses.

Q. Do you recall any recent case in which outside manufacturers have been permitted to manufacture an article under one of the Bell patents?

A. Well, I have in mind a couple of rather minor cases, yes. Within the last month or so?

Q. Yes.

A. We had a request in regard to a lineman's tool which we developed. It was a convenient tool for linemen to use. [fol. 7890] It was adopted for many different uses in the outside plant, and it was worked out so that it would be a particularly convenient tool. A manufacturer of tools wanted to know if he could supply those to other customers of his. Electric light companies particularly were among his customers. And we have advised him that he can do that. And there was another manufacturer who is making a type of guy rod that one of the men in my own department obtained a patent on in the course of that work.

Q. You only call attention to those as being very recent and sometimes a permissive use?

A. Yes. Now, you ask me as to the number of patents, and I have the information as of January 1st of this year, 1924.

Mr. Dotson: May I ask upon what basis that use is permitted to outside users? Upon what basis is that service allowed to outside users?

The Witness: You mean is there any royalty exacted?

Mr. Dotson: Yes.

The Witness: In those particular cases there was not. That was a case where the patent was not a particularly important thing. We patented it so that somebody else would not come along a year later and patent it himself and

then undertake to hold us up. That is the reason why we did it in that particular case.

Mr. Dotson: Your answer applies to both the guy rod and the tool?

The Witness: Yes. In the case of important patents [fol. 7891] which related to some important phase of the telephone business, those are for the exclusive use of the associated companies. As of January 1st, 1924, the American Company owned or controlled or held a license under 4,678 patents, and there were 2,742 applications pending, a total of over 7,500. Now, I have a list of those patents.

Mr. Burr: The list of patents may be marked Rhodes Exhibit No. 4, and it is offered in evidence.

And thereupon the list above reverred to was marked for the purposes of identification and was offered and admitted in evidence on behalf of the Ohio Bell Telephone Company, and is herewith submitted, marked Rhodes' Exhibit No. 4, and made a part hereof.

The Witness: Now, the subject matter of many of these patents is of great importance in the telephone business. There are groups of them taken together, large groups of them that cover matters of vital importance in work that is under way relating to apparatus, methods and systems for still further improving the transmission of speech. There are other groups that cover ground now being traversed in switchboard improvements.

Another important phase of these patents is that they cover the systems which the associated companies are now using, in addition to the improvements which they will use in the future. That means that they assure the associated companies the unmolested use of the systems which they [fol. 7892] now have. Anyone of a large number of these patents, if it were held in hostile hands might be made the basis of a successful suit against an associated company and very expensive reconstruction to avoid infringement or else the payment of a large tribute to the hostile owner of the patent.

The important duty that this staff has in relation to patents is to be continually on the lookout for worthy ideas from any source and to that end all patents that are issued and all ideas and suggestions that are submitted to us by inventors are very carefully considered to see if they contain the germ of anything that could be developed and perfected and made useful in the telephone service. We have

examined over 5,000 patents in the last ten years. Our regular organization calls for these patents to be submitted by the patent department to our Department of Development and Research, and we study them, and if they contain anything of merit, the Patent Department seeks to acquire the necessary rights under them.

There is just one subject in that connection that might possibly be something that someone might want to inquire into and we might save a little time by anticipating it. On one or two occasions people have asked me if we do not buy up patents and suppress them. I can say most emphatically that we do not. We do not use directly the apparatus under many of the patents that we have because, I have explained, we have to be prepared to go into a number of lines of de- [fol. 7893] velopment, and when worked out, that invention does not apply. But if we suppressed inventions we would be shortsighted, and it would not be to our advantage.

A great many times while we were working to get out an operative telephone repeater, the statement was made that we were suppressing repeater inventions. We would have been feeble-minded if we had done that, because the best thing we could have in our business would have been just that. It would have been a cheaper plant for long circuits all over the United States. I do not know that it is necessary to argue that point, but I think that is one illustration of it.

Suppose that we did suppress useful patents. We cannot control the telephone business. We cannot control it in countries outside of the United States. Our patents do not hold in Europe, Japan and other countries. If we suppressed them, these people would make use of those things and their telephone systems would be better than the telephone system in the United States. And the reverse is true, because they send people from other countries here to find out how telephones are operated in the United States and go home and try to do as nearly like we do in this country as they can.

Q. Will you take up the Department of Operation and Engineering next, if you please?

A. That is the Department which is in direct consulting and advisory relation with the engineering and plant department officials of all the associated companies. Now, in

[fol. 7894] this work, I might say right here, our people do not attempt to dictate to the officials of the associated companies how they are going to do their work, but the plant superintendents and the engineers know that they have this organization, that whenever they have a difficult or complicated question or any other kind of question they can get in touch with the people in this department and get the best advice they can get out of that organization as to what to do in regard to all of their problems of operation and engineering.

Q. You refer to the plant engineers of the associated companies?

A. Yes, sir. Now, this indicates the division of the work of this operation and engineering department between *tween* the three functions of plant, traffic and commercial. There are similar divisions in the operating organizations of all of the associated companies, so that the man who is in each line of that work in the associated company has direct contact with these people who are performing that work on the staff.

Under plant there is a division of plant engineering, which I think is almost self-explanatory from the legends that are indicated on this chart. For instance, there is a Central Plant Engineering Organization that advises the associated companies of the proper uses, the proper places to use, the new developments of the system; and they advise them with regard to the modification of our standards which [fol. 7895] it is frequently wise to make in special cases. On request of the associated companies they will review the plans of the associated companies for new work, comment on them, and criticise them for them. They give technical advice: for instance, the problems involved in consolidations of plant. They give help in preparing plans for cut-overs when a new office is to be opened.

Now, under the head of plant operation there is some work shown there on operating practices and on accident prevention. We have always given attention in our work in setting up our standards to the safety of the public and of our own employees. In recent years we have been doing some additional and rather intensive work on that particular subject. This particular section has made a study of plans for reducing accidents to employees. They analyze the reports from the associated companies for every lost time accident that occurs to a plant employee, and this has

enabled them to make numerous suggestions looking to the elimination of the cause of the accidents, thereby reducing accidents to a minimum. In order to foster the interest of the employees in safety work there have been plans of action suggested to the associated companies, which included the preparation of safety codes by employees, in order to get the employees' direct interest in the work. And our people have contributed suggestions and comment in regard to that.

There have been methods set up for training, first aid [fol. 7896] teams, in the associated companies and for getting up competitions between them, to keep their interest alive.

Now, just let's see what that has amounted to. We have some statistics on the reduction in accident frequency rate among the male plant employees in the Bell operating companies. And to show that on a scale, we will take the rate of accidents, beginning in the third quarter of 1921, calling that a hundred. The rate then was not abnormally high. It was rather low to begin with. In the fourth quarter that came down on the scale of a hundred to ninety-five. For the four quarters of 1922 those figures respectively were 91, 81, 74, and 67. For the four quarters of 1923, 62, 52, 52 and 46. That is as a result of that intensive work, the accidents in the systems were cut in half.

I might also mention under that plant engineering work, there is where that has become particularly important in connection with the increasing cost of labor, and we have gone in there to the development of special machine tools in construction, automobile truck equipment, tools for cutting through pavements where underground construction is to be placed, the use of power driven pumps for pumping water out of manholes.

The traffic end of that work I won't touch, because there is another witness on that, and the commercial end is pretty fully studied. They advise the associated companies in regard to directory methods. That is a very important item in the Bell system, because in the system as a whole there [fol. 7897] is an expenditure of about $8,000,000 per year in directories, and anything that can be done to minimize in that direction is a help. Also a great deal of work has been done on adopting the right character of type for directories and the proper kind of paper to use.

Telephone sales methods are gone into carefully and also there is another portion of that department dealing with forecasting the future, which I will go into more fully later on. I might say there is one small section of that that is concerned with studies and tests of office supplies and office appliances. That does not seem so much like an important thing, but it is rather interesting. In the beginning a man from this organization visited all of the associated companies and studied their requirements very carefully. He found right at the beginning that there were 86 different varieties of lead pencils that were used in the Bell system and one standard kind would do for about 83 per cent of all the work. That saved on the whole system $15,000 a year, because in all of this work where you can unite on one thing, you have the consolidated purchasing power of the system, which enables you to buy more economically. These people made careful investigation of paper and printed forms. Instead of leaving the choice of the paper for the great variety of forms that were used in the system to the printer, the requirements of each kind of form were carefully studied, the question of how much wear and tear it would be subjected to, whether it had to be folded or not, whether there was a necessity to make erasures and changes [fol. 7898] in the form. What it resulted in was the use of a higher grade of paper for the important and permanent forms, and the cheaper grade of paper for the forms for which the use was rather transient. The transactions were estimated and the requirements bulked, so that the paper contracts could be made directly with the mills, and as a result of utilizing that purchasing power there was a saving of a quarter of a million dollars alone on that in the entire system.

Q. That is in the item of stationery alone?

A. Yes, on that portion of the stationery, the printed forms. Now, on the office appliances they have recently made a study of devices for preparing the toll service statements, the individual bills to the subscribers for their toll service, and that is rather characteristic, that little investigation of some of the work we had, and I will take just a couple of minutes to talk about it. There were various typewriters and account billing machines that were on the market for that purpose. Well, these people tested 63 machines of four distinctly different types that were submitted by six manufacturers and they compared the results on those ma-

chines with the results of posting the items by hand on the statements. They selected nearly three quarters of a million representative toll items, and they were posted under special observation to about 75,000 toll service statements. That work was all verified to determine its accuracy, and detailed stop watch tests were made as to the time taken. The advantageous features of different machines were [fol. 7899] pointed out by the different manufacturers, and arrangements were made with them to develop special equipment that incorporated the desirable features and eliminated some features that were not useful in that particular work. The result was that a special machine was developed which was availab-e to the associated companies at a quarter of the cost of the machine that was first tested that gave the greatest production. And it is estimated that the use of that machine will reduce the labor on that work in the associated companies at least twenty per cent, which will represent in the Bell system a saving of about $150,000 a year.

Mr. Dotson: Are these supplies and machines you have just described invoiced to the associated companies at the same price exactly *they* invoiced to the American Company?

The Witness: The American Company does not buy these. The associated company buys them. They buy them through their purchasing agent, which is the Western Electric Company.

Mr. Dotson: The American Company gets no——

The Witness: The American Company gets no profit on it at all.

Mr. Dotson: So that these associated companies are able to buy in quantities?

The Witness: Because they have a common purchasing agent, which is the Western Electric Company, and it purchases on a small commission to cover the cost of the purchasing work.

Mr. Dotson: Do you know what that commission is?

[fol. 7900] The Witness: It runs somewhere—it varies with different items. It runs somewhere from two per cent up to four or five.

Q. What is the reason for the variation of percentage?

A. Because there is more labor in buying some things than others. For instance, in buying copper wire the amount of work is pretty small. The work that the Western Elec-

tric Company does in that covers the warehousing also, warehousing the material in their different branch offices throughout the country.

Q. Have you referred to Exhibit No. 3 as much as you care to?

A. I think so.

Q. Let me ask you about that Exhibit and all of the others which have been or will be hereafter offered in evidence by you, I take it that you are familiar with the contents of all of them, particularly the printed statements contained in them?

A. Yes, sir. I went over this particular one carefully myself and prepared most of the statements, and then I went back and talked to the heads of these various departments to be sure I had given a fair picture of what their work was, and then the thing was laid out, drawn up by draftsmen, a zinc plate made, and they were printed.

Q. Are all of the statements in all of the Exhibits true and correct to the best of your knowledge and belief?

A. They are.

Q. I do that to avoid any other question?

A. Yes, sir.

[fol. 7901] Mr. Dotson: Just one more question with reference to the Exhibit No. 4. All of the various bracketed forms, do those represent sub-divisions in each case?

The Witness: Yes, sir. I think that will be made clear by another Exhibit which I have of both the Departments of Development and Research and the Department of Engineering, because it shows here the names of the men and the numbers of men who were working on each one of these subdivisions.

Mr. Burr: The organization diagram, showing the Department of Development and Research, may be marked Rhodes' Exhibit No. 5, and that showing the Operation and Engineering Department, Rhodes Exhibit No. 6, and we offer them in evidence.

And thereupon the paper writings above referred to were marked for the purposes of identification and offered and admitted in evidence on behalf of the Ohio Bell Telephone Company, and are herewith submitted, marked respectively Rhodes Exhibits Numbers 5 and 6, and made a part hereof.

Q. Will you tell the Commission a little more about those two departments, Mr. Rhodes, if you please, also give the

number of engineers and their training? Before answering that question however, will you please tell the Commission whether or not all of the services referred to in your Exhibits Numbers 3, 5 and 6, and the other Exhibits which [fol. 7902] will follow, are available to the Ohio Bell Telephone Company as one of the associated companies?

A. They are.

(Previous question and answer read.)

The Witness: Exhibit 5 shows the organization of the Department of Development and Research which on October 15th, 1923 had 357 employees. It shows under the Vice President in charge five sub-divisions, one at the left under the equipment development engineer, which is concerned with the Department of Apparatus, central office and sub-station apparatus. Then there is the research engineer, who is dealing with mathematical and physical research of a very high order in improvements in the transmission of speech.

The next is purely an internal executive section for the administration of the department.

Then there is the outside plant section, which is the one that I am concerned with, and there is engineering dealing with electrical interference problems, and another large section dealing with transmission development.

The Operation and Engineering Department on October 15th, 1923 had 590 employees. The top of the organization is shown on the first chart, and then the sections reporting to each one of the principal men shown there is contained in the following pages. I can bring that number of people a little further up-to-date, giving the figures as of December 31st, 1923.

The Department of Development and Research had 333 employees, and the Operation and Engineering 529. Now, [fol. 7903] I do not want to be misunderstood. Those people are not all engineers, of course. There has to be a stenographic force and various employees for the operation of a department, but in general the trained engineers in the development and research constitute a little over 60 per cent of all the employees, and in the operation and engineering it is a little less than that. We had in those two departments at the end of last year a total of 892 people.

Now, these General Staff engineers are not only highly experienced specialists covering the branches of telephone

engineering work, but nearly every one of those engineers is a graduate of one or more American Universities, Colleges of Technical Schools of recognized engineering and scientific standing. In these two departments there are 118 different American Colleges represented and eleven foreign Universities. I might say that in these two departments we have 18 men who came from colleges in the State of Ohio. I can give you the names of the colleges if you would like to know those that are represented on the staff.

Mr. Burr. Would the Commission like to have that?

Commissioner Poor: What was the statement?

Mr. Burr: Mr. Rhodes was referring to the fact that 18 of the men in these two departments were graduates of Ohio Universities, that is, Universities of this state and he said he could give the names of the Universities if anybody cared to have that.

Commissioner Poor: No, I think not.

[fol. 7904] The Witness: By concentrating the development, research and engineering work and the consulting services for the entire Bell system in this organization, we are enabled to maintain as the organization diagram shows, a force of expert specialists on every branch of the work, and by consolidating the general problems of the system, and bringing them to this organization, there is enough work to enable the staff to maintain a specialist on every technical point in the business, whose duty it is to devote all of his time to it and to know the last word in his specialty, and at all times to have this information available on call, for the benefit of one and all of the associated companies.

Now, this work requires all of the time and effort of these people who are shown on this diagram. I mention Mr. Campbell, the research engineer. We have a certain number of scientists who are constantly watching the fundamental discoveries of science, to see what may be learned, and in these days when the scientists of the world are making such fundamental discoveries, when they seem almost to be on the verge of discovering how matter is put together, we feel it is very important to keep in touch with all of those developments, so that we shall be in position to take advantage of them as promptly as may be in promoting the telephone art. Of course, that takes the time of only comparatively few men in this organization. The most of them are concerned with more direct practical problems.

Mr. Dotson: Do I understand that the full force of em-
[fol. 7905] ployees you have mentioned are devoting all their time to the work?

The Witness: Yes, sir.

Mr. Dotson: Does that vary during the year or does the office force, is the office force large- some portions of the year than others?

The Witness: No, It is a matter of rather steady increase. I think that you might be interested in that connection to know that these two departments in April, 1918 had a total force of 350 people; in July, 1919, 519; in June, 1920, 634; in January, 1921, 770; in March, 1921, 806; in December, 1921, 877. It has been a matter that, as we do one thing, opens up opportunities for improvements related to that thing.

And another fact is this, that as the business grows and comes to be very large, it is economical to take up investigations into things that when it was small were perhaps less worthy of going into, just like that matter of lead pencils. When the system gets big enough it is important. If there are only a few people it is not worth going into.

Q. Have you work for all of this number *of* constantly?
A. Yes, sir.

Mr. Dotson: Is the operating cost of these departments maintained entirely from the license revenues of the associated companies?

The Witness: I presume it is, yes. The most that I know
[fol. 7906] on that was contained in the statement that the President of the company made in the annual report for 1920, and that might be pertinent at this time. Speaking of this license contract services he said:

[fol. 7907] "The total receipts for these services in 1920 were $17,675,695.51. No separate telephone system in a city or state could perform these services for itself. Because the Bell system is a single, nation wide system, and because the services are general services in the direction of efficiency and economy, resulting in the possibility of lower rates, the apportionment of charges by a percentage upon revenue (4½%) seems to be a logical one.

Without including any provision for contingencies which may occur in the future and which should utimately be treated as part of the cost of 1920, careful estimates of the cost separately and independently made vary between $14,-

770,918.00 and $16,415,890.00. Margin between same and receipts, whatever it may be, after allowance for contingencies, contributes to the efficiency of said system by providing a broader latitude in the initiation of projects and by strengthening the financial credit of the system."

[fol. 7908] Is that the thing you want?

Mr. Dotson: Yes.

The Witness: That is the point you had in mind?

Mr. Dotson: Yes, that is the point I had in mind. Then you have no definite figures as to the actual cost of these services; you have definite figures as to the revenue of the license contract——

The Witness: Not beyond that. I want to tell you all that I know about it. I have in mind the budget for our department of Development and Research for the year 1924. It is about three and a third million dollars for that one department, which includes a sum of nearly a million and a half dollars paid by us to the Western Electric Company for development work which they do for our department.

Q. That three million dollars was the——

A. That is that one department. I do not know the budgets of the other departments. I——

Mr. Dotson: Well, the license revenue is not apportioned to various departments; the cost of the different departments is taken out of the license revenue without any apportionment whatever to that department of certain portions of the revenues.

The Witness: It is my understanding that revenues of the American Company come from several sources, from the securities which it owns in other companies, from the revenue from its Long Lines Department, the lines connecting the territories of the associated companies, and from [fol. 7909] the license contract. But as I understand, none of those dollars coming in have any particular tag put on them, that they go for one particular purpose.

Mr. Dotson: I didn't know. The reason I asked that was whether you made any apportionment of the cost of operating the various departments or subdivisions.

The Witness: We do make a budget for the year ahead, and we endeavor to hold as closely as we can to that.

Mr. Dotson: What is the character of these securities of other companies that you mentioned in this answer?

The Witness: The stocks and notes of the associated companies and the majority interest in the Western Electric Company, which is the manufacturing branch of the Bell System.

Mr. Dotson: Well, the American Company has an income also from toll revenues.

The Witness: Yes, from the Long Line.

Mr. Burr: He mentioned that.

The Witness: I mentioned that.

Mr. Dotson: Pardon me. I did not notice that.

Mr. Lewis: How much of the stock of the Ohio Bell Telephone Company is owned by the American Telephone & Telegraph Company?

The Witness: I cannot tell you exactly. I understand a very large proportion of it.

Mr. Lewis: Practically all of it?

Mr. Burr: You are talking about the common stock now.

Mr. Lewis: Yes, and it also owns a majority of the stock [fol. 7910] in the Western Electric.

The Witness: Oh, yes, I understand the ownership in the Western Electric is somewhere around 98 or 99 per cent.

Mr. Burr: My recollection is that the Ohio Bell Telephone Company has something over 3,000 stockholders.

Mr. Lewis: Those are holders of the preferred stock?

Mr. Burr: Yes.

Mr. Lewis: Would this statement be correct, that the American Telephone & Telegraph Company owns all but about $1,200 of the common stock of the Ohio Bell Telephone Company?

The Witness: I could not tell you, sir.

Mr. Lewis: You could not give any accurate figures on that?

The Witness: No.

Mr. Burr: Do you know how much revenue is derived from the stocks, from these securities that are held by the American Telephone & Telegraph Company?

The Witness: I think that is given in the annual report, but there is going to be another witness from the accounting department who is going to be much better informed on that than I am, and he would be glad to give you that information.

Mr. Burr: I can tell you this much, that it does not get anything from the common stock which it owns of the Ohio Bell Telephone Company.

Mr. Dotson: It is pretty common stock.

[fol. 7911] Mr. Maltby: Common but not very pretty.

Q. Will you describe, Mr. Rhodes, if you please some of the work which the General Staff has been doing in technical development of the telephone art, and in doing that will you please begin with the subject of cable development, for example and show what has been done? and what the results have been?

A. I would like with your permission to go back a little in that to the very early days of the business, back to the time when we did not have any cables at all, when it was necessary to run the wires on crossarms and roof fixtures over housetops, and entirely on crossarms on poles. There was no satisfactory way in the early days of the business to place the wires in cables. In 1882 the American Company conducted some experiments alongside of a railroad track in Massachusetts where some wires were grouped together in a cable and laid in the ground. They were laid by going out on this railroad early one Sunday morning and attaching a plow to a car and plowing open a trench, and then laying the cable in that trench, and then running the train along with a drag to sweep the earth back in on top of it.

Q. That trench was along the side of the railroad track proper?

A. Yes, it was right on the railroad right-of-way.

Q. But outside of the ties?

A. Just outside of the ties, yes. They had a good many troubles in doing that work. They didn't think of this plow idea until they got out there. Then they went to a farmer to get a plow and he wouldn't have it used on Sunday under any conditions whatsoever. And they had quite a [fol. 7912] time getting a plow. They went ahead with that work and it didn't come out very satisfactory. The cables leaked and they cut down transmission and generally acted very badly. However, in the following year there were plans made to lay some cables in Boston, and a conduit system was put down and some cables were placed. The next one was about a quarter of a mile long. They employed copper wires that were rubber insulated. That as of enough importance so that it was mentioned in the an-

nnal report of the American Company which came out in March, 1883. There was a little paragraph on it which I think as part of the historical background of this cable works is rather illuminating, and I would like to read it.

"In the work of putting wires underground the progress has not been as satisfactory as could have been wished. Underground cables have been laid in iron pipes in Boston in two directions from the main office, one line being 1,200 feet long and the other 1,485 feet in length. Conversation is successful within short limits over these lines, but where they are used in connection with long lines, for instance, those reaching to the suburb"—that was their idea of long lines at that time—"The voice becomes indistinct. Unless this difficulty can be removed, connection with points outside of Boston will be almost, if not quite, useless to those whose wires are underground. With our present facilities for experiments we can readily test the value of such improvements as may be offered, and we hope to get definite [fol. 7913] results before long in this direction."

After that there came experiments with different sizes of wires and different thicknesses of rubber, but the sound was muffled. It sounded as though, as one man described it at the time, it sounded as though the other man's voice was coming out of the ground, and another person described it as sounding as though he was talking in a barrel. The quality of the voice was almost unrecognizable. There was bad overhearing, cross-talk we call it, from one circuit to another in the cable, and that led to the conclusion that the best insulation for the cables, which was rubber or gutta-percha, was unsuited for telephone use. Unfortunately we cannot get hold of a piece of that very early cable, but I have got a piece of the cable which is most like it of anything at the present time. There is a cable contains eleven pairs of wires, insulated with this rubber compound, and I have pictures of that if you wish to have those in evidence.

Mr. Burr: That photograph may be marked Rhodes' Exhibit No. 7, and we offer it in evidence.

And thereupon the paper writing above referred to was marked for the purposes of identification and was offered and admitted in evidence on behalf of the Ohio Bell Telephone, and is herewith submitted, marked Rhodes Exhibit No. 7, and made a part hereof.

[fol. 7914] The Witness: Now, the next development that came after that was placing fifty wires that were insulated with cotton in a pipe. They were drawn in this pipe, and then the pipe was filled with oil, trusting the oil to maintain the insulation of the wires.

Q. Was that oil known as Ozite?

A. No, that was not. This was long before the Ozite. It was in what is known as the Brooks system. They used a heavy paraffine oil. Ozite came later. Then came the use of cotton covered wire that was impregnated with paraffine, and there the wires were formed into a core and pulled into a lead pipe of quite considerable length, perhaps fifty or sixty feet of this core were pulled in. We had not got to the point of applying the lead sheath, continuously to the cable.

Then the General Staff engineers, working with the Western Electric Company, developed the use of dry cotton, instead of putting in paraffine, and it was found that cotton which was baked dry, all of the moisture driven out of it, and then promptly sealed in a lead pipe, was much better insulating material, and those wires talked. They exercised less of that distorting effect on the telephone conversation, due to the fact that they had what is technically known as lower electrostatic capacity between the wires. Finally, in about 1888 or '9 as the result of experiments conducted with dry paper, it was found that dry paper was the best insulating material that could be used for telephone wires and gave the lowest electrostatic [fol. 7915] capacity.

Q. Who performed those experiments?

A. The particular individual that performed those was Mr. John A. Barrett.

Q. What I had reference to was whether or not——

A. He was working in the plant of the New York and New Jersey Company in Long Island in connection with the engineers of the General Staff, and the work was done there because it was convenient to a man who had a lead press for extruding the lead sheath on the cable.

Q. It was part of the work of the Department of Development and Research?

A. It was very carefully carried through by that department.

Mr. McConnaughey: Was he a part of that organization?

The Witness: Why he was and was not. He was detached at that time for service with the New York and New Jersey Company. He was probably on their payroll at that time. But it was for cable work that was followed by the General Staff and was going to be applied in the plant of that company. It was a rather interesting thing that the use of this dry paper was discovered more or less accidentally. Cable cores, with the paper cover wrapped around the wires, were manufactured at the plant in Connecticut, and then they were run through a tank of sealing compound and then covered with the lead. They were getting some of those cables out in a great hurry, and they run it through very rapidly and found that it had particularly favorable electrical qualities, better than anything that had ever been made before. So they immedi- [fol. 7916] ately dissected it and found out that it had been run through so quickly that this sealing compound had only gotten on to the outside, and the inside was clear paper. And it was that idea, followed through, that led to the present pipe of cable.

Back at that time they could only put 50 pairs of No. 18 gauge wire in a full sized sheath. That type of cable has gone through a long series of tests and a continuous train of development extending over a period of thirty years.

Q. Tests by what department?

A. By the Department of the General Staff. It has involved a study of the materials and the methods of construction, such as the transmission efficiency, and where best to use different types of cable most economically in the plant. I will just briefly run through what that development has been. In 1891 the use of No. 19 gauge wires was settled upon, and in 1892 it was possible to put a hundred pairs in a sheath.

Q. How had that been brought about? By experimentation?

A. By experimentation, yes. Then in 1895 we got 120 pairs, and later in that year 150 pairs of 19. In 1896 we got 180 pairs, and somewhere between 1896 and 1898 we got 200 pairs, all of 19.

Q. Was that the result of continuous experimentation and working on the idea?

A. It was. I was engaged myself in some of that work when I first came with the company. I went around the country myself and made a lot of electrical measurements [fol. 7917] in different cities. The nearest I came here was Cincinnati in 1895, where I made some tests. Then in 1900 we started on the use of what we call fine wire cable, 22 gauge, wires weighing about half as much per unit of length as the 19 gauge did. That and the following year we made three and four hundred pair- cable with 22 gauge conductors. Then in that same year we raised the 19 gauge cable from 200 to 300 pairs.

Q. Was the installation at this time a single paper wrap?

A. Some of it was single and some of it was double. The single was a process from the double. There was a great deal of work in getting the right method of applying the paper to the wires so as to get as much air into the cord as possible; air was the best material possible, but you could not keep the wires apart with air. You had to have something else. In 1902 we got 600 pairs and in 1912 900 pairs.

Q. How did you bring about that reduction?

A. It was largely brought about in two years by improving the method of applying the paper by the use of narrower paper than was ever used before. And another proposition was that that raised the capacity, and with the same type of instruments that had been used before—by "Instruments" I mean the transmitters and receivers—that would have had the effect of reducing transmission, but the improvements that were made in transmitters and receivers have enabled the associated companies to use a cheaper type of cable than they could have. It is a combination of the two causes.

[fol. 7918] Q. How was that worked out? A. That was worked out by the engineering department of the General Staff.

Q. Yes. A. In 1912 we obtained 900 pairs of 22 gauge cable and in 1914 we obtained 1200 pairs in a 24 gauge cable. In about 1918 we made a further improvement in the 19 gauge cable coming up from 300 pairs to 450. I will speak about that a little later.

Now, I have a diagram that shows the cross-sections,

actual size, of the principal or most important of these steps that I have been talking about in cable development.

Mr. Burr. It may be marked Rhodes' Exhibit 9 and is offered in evidence.

And thereupon the photograph above referred to was marked for the purposes of identification and was offered and admitted in evidence on behalf of the Ohio Bell Telephone Company, and is herewith submitted, marked Rhodes Exhibit No. 8, and made a part hereof.

The Witness: Now, in connection with that Exhibit, which shows the physical accomplishment, the greater number of wires, I would like, right along with that, to show a diagram as to what that has meant in the cost of the plant.

Mr. Burr: It may be marked Rhodes' Exhibit 9 and is offered in evidence.

And thereupon the diagram above referred to was [fol. 7919] marked for the purposes of identification and was offered and admitted in evidence on behalf of the Ohio Bell Telephone Company and is herewith submitted, marked Rhodes' Exhibit No. 9, and made a part hereof.

The Witness: And I would like to talk a little bit about that if I may, Now, in making this diagram, this shows the cost of a mile of circuit in what we call a full size cable, which is about 2⅝ inches in diameter outside. I have shown along the bottom of this diagram the years from 1888 up to 1922, and vertically along the side of it is a scale showing the first cost of a mile of pair in these cables, installed, including the ducts. Now, in order to eliminate the effect of changing costs of material and changing costs of labor, these cable costs have all been computed on the basis of the material and labor costs, have been figures on the same labor rates and the same cost of materials through that period. Now, that shows back in 1888, away up at the top of that sheet at the lefthand, when we were able to put fifty pairs of 18 gauge, that mile of circuit cost over $150.00. Now, the line you see coming down shows the way the mile cost of each circuit of this cable was reduced, and down here you have the figure of $30.00 per mile of pair. The next line beginning in 1901 shows the cost of Number 22 gauge cable,

and the lowest line of all, beginning in 1914 shows the cost of a mile of pair in this Number 24 gauge cable, which means that in that type of cable we are getting a mile of [fol. 7920] circuit for not over $15.00, a little less than $15.00, which is only one tenth of what a mile of circuit in cable cost back in 1888.

Q. With the great difference in the number of wires contained also? A. Yes, but that is taken care of in this cost, because the duct savings are included in this.

Q. I was not thinking the cost end of it, but the utility end of it. A. The fact of the occupancy of the streets, for instance, or the number of cables that are put on a pole line, that is a factor in it. Now, at first sight in looking at this diagram it might appear as though we had pretty nearly reached the end of this cable development; that is, back in the nineties each successive development made a great big drop in the cost, and that drop from the successive developments has been growing less, but that does not mean that the total number of dollars that has been saved by each of these later improvements has been less than the savings that were made back in the nineties. On the contrary, each one of these later steps in the development has made a bigger saving in the system; it has saved more dollars than were saved by those other improvements. Now, the reason of that is that there is so much more cable added to the plant now than was the case 25 or 30 years ago. For example, in 1892 there were 20,000 miles of wire underground added in the Bell system, and that was a pretty considerable amount, but thirty years later, in 1922, there were two million miles of work added; that is a hundred times as much as was [fol. 7921] added underground in the Bell system in 1922 as in 1892. Now, the much larger savings of recent years are due to the fact that these relatively small amounts multiplied a hundred times will exceed the savings made back in those early days of the business.

Q. I understood you to say that in the comparison shown in Exhibit No. 9 material and labor costs are figured on the same basis throughout the period of years shown in the diagram?

A. That is right.

Mr. McConnaughey: Those costs as shown there are the costs of a single pair.

The Witness: Yes, one pair in a cable. Of course, what that means if you double the number of pairs, why, your lead sheath does not cost anymore and your duct does not cost anymore and consequently those items are being divided by twice as big a figure, because it comes down all the time. Now, I have a sample of this 1200 pair cable that I was talking about there.

Mr. Burr: The photograph of it may be marked Rhodes' Exhibit No. 10 and is offered in evidence.

And thereupon the photograph above referred to was marked for the purposes of identification and was offered and admitted in evidence in behalf of the Ohio Bell Telephone Company, and is herewith submitted marked Rhodes' Exhibit No. 10, and made a part hereof.

[fol. 7922] The Witness: This cable is made up of wires twisted in pairs, and each one of those pairs of wires constitutes a telephone circuit. Now, in the structure of the cable it is made up in layers that are spiral, one layer in one direction and one in another, and it has been cut down at this end in order to show those layers, and the dark color is simply because it has been shellac-ed so that it won't fray out at this end.

Q. When you say "At this end" you mean the end that is fanned out?

A. Yes, at the end that shows on the end of the diagram as tapered. At the other end it has been fanned out merely to give an idea of the considerable number of wires that it contains. The amount of wire in that cable can be shown in another way, by taking a section of that cable, just about an inch long, and pushing the wires out, in order to show what they amount to. Just push the wires. The wires are colored, or, rather, the paper surrounding the wires is colored, for purposes of designation. In the first place it is desirable in each twisted pair to have one wire distinguished from its mate, on order that they may be properly connected together. Then you will find other color combinations which are introduced for this purpose. It is necessary in splicing a branch cable to a main cable, to have it spliced to a particular number of pairs. That means that if the wires were all similarly colored, a splicer, in order to identify these pairs by position, would have to go through that 1200 pairs of wires to pick out for example the particular end that he

[fol. 7923] desired to obtain. Now, by making each group of a hundred pairs a different colored combination, he knows that the hundred that he wants are of that particular color and he can pick out any desired pair, simply by testing through a hundred instead of testing through 1200. It is really an economy in splicing.

Q. Who worked out that phase?

A. That was done by the General Staff in the very early days of the business. Now, in connection with the paper which is used for insulating these wires in the cable——

Mr. Burr: We have a photograph showing a section of the 1200 pair cable and it may be marked Rhodes Exhibit No. 11 and is offered in evidence.

And thereupon the photograph above referred to was marked for the purposes of identification and was offered and admitted in evidence on behalf of the Ohio Bell Telephone Company, and is herewith submitted, marked Rhodes Exhibit Number 11, and made a part hereof.

Mr. Maltby: It is reduced in size.

The Witness: That is reduced in size, yes. I might say at this point, Mr. Burr, in partial answer to your last question that the Department of Development and Research prepares the specifications under which these cables are manufactured, and I have here four typical specifications covering the detailed requirements for the manufacture of [fol. 7924] the cables and the tests that they are required to fulfil-.

Mr. Burr: Let specification No. 4123 be marked Rhodes' Exhibit No. 12; specification No. 4124, Rhodes' Exhibit No. 13; specification No. 4125, Rhodes Exhibit No. 14; and specification No. 4130, Rhodes' Exhibit No. 15.

And thereupon the specifications above referred to were marked for the purposes of identification and were offered and admitted in evidence on behalf of the Ohio Bell Telephone Company, and are herewith submitted, marked respectively Rhodes Exhibits Numbers 12, 13, 14 and 15, and made a part hereof.

The Witness: Now, there has been some very interesting work in connection with the paper which is used for insulating these wires. At the beginning of the World War we were confronted with a very serious situation of continuing

the supply of paper that is used in insulating these wires in the cables. For a great many years that paper had been made from old Manila rope stock. The new Manile fiber did not make a satisfactory fiber.

Q. How did you find that out?

A. By trying it.

Q. Who did the trying of it?

A. That was done under the direction of the General Staff. We have been seeking constantly to improve the paper and to bring down its cost. It was necessary to collect this old rope from the Maritime cities of the world largely in Europe. And at the time of the War that supply [fol. 7925] was greatly reduced.

Q. That was the rope from which the hemp was secured for the making of the paper?

A. Yes. The new Manila, the fibers are what the paper manufacturers called harsh. They do not lend themselves to a soft pliable, yet strong paper. The necessity for strong paper largely in the manufacture. The cables have to — insulated at very high speed, and a weak paper means a constant breaking and interruption and slowing down of the process of manufacturer, and increasing the cost.

Q. So that having discovered that the old Manila rope was better adapted to your purposes, you say you had to collect it how?

A. It is collected from all over the world from seaports where old rope is discarded by vessels and new rope is bought by them. The old rope is bought by agents all over the world. It was necessary then during the War to immediately take steps to conserve the supply of paper and to start at once a series of tests to see what we could do in the way of diluting this Manila paper with substitutes. We at once on the staff obtained the services of a consulting paper expert, and with his assistance and with our conferences we determined what to do.

The first thing we did was this. There is a paper wrapping that is applied around the core of the cable, between the core and the sheath. That paper did not affect the electrical behavior of the pairs in the cable. So we introduced a very considerable amount of wood fiber, wood paper, wood [fol. 7926] pulp paper in that wrapping. Then the best alternative material was cotton, and we had made cables containing paper with different amounts of cotton, and we

placed those immediately in the plant, and we also subjected them to accelerated tests, so that we could determine the behavior of that material. The result was that we were able to dilute the paper partially with cotton and obtain a very satisfactory kind of paper.

You see the difficulty is this, that if that insulating material contained any chemical that would later in the life of the cable produce internal decay, if the paper would rot or disintegrate, why the whole system would be faced with a tremendous calamity, if the cable should break down, and it meant that a very careful study had to be — by physicists and chemists, and a great deal of care taken. We had to determine the tendency of the paper to deteriorate under the influence of heat, because some of the cables in the conduits alongside of heating pipes, underground heating pipes, would be affected; and we had to determine the effect of the paraffine that is used in the splices at joints; and we had to determine the electrical qualities, of course, of the paper, and its ability to stand bending and twisting, which it gets while the cable is reeled and when it is installed.

Q. Were those studies made in your department?

A. Yes, sir, in the particular department that I am responsible for. Now, another interesting proposition comes up in regard to the sheath of that cable. It was early in the [fol. 7927] development of the business found out that lead alone was not the best material for cable sheaths. It did not have the proper mechanical strength. It was weak. It would not stand the installation, and, what — still worse, when it was used for aerial cable, it was subjected to a constant vibration, and it tended to crystallize and crack. The early cables made use of an alloy of 97 per cent of lead and three per cent of tin, which was much stronger and much more able to resist vibration than pure lead. Well, back in 1908 or so, we had been confronted with the gradually increasing price of tin, so that if only three per cent was used in cable sheaths, the cost of it amounted to quite a considerable element in the cost of the cable. And we sought to find a new alloy that would be equally as satisfactory as the three per cent of tin and would reduce the cost of the cable to the associated companies.

Well, we made experiments and field trials that extended over a period of four or five years, and we started in studying a wide range of alloys. We studied alloys of lead and tin in other proportions than the 97 and three per cent we

had been using, and alloys of lead and bismuth, and what are called — of three metals, lead, tin and copper, lead, tin and antimony. There was a range of some fifteen or twenty different elements and in different proportions of these elements.

We tested those first in the laboratory to determine their tensile strength, and their ability to withstand bending. [fol. 7928] And we constructed a special vibrating machine, whereby they were vibrated very rapidly and an account taken of the number of vibrations they would stand before they broke. And then they were tested also for their ability to withstand chemical corrosion. We tested them with a good many chemical agents, and we also got soils and liquids collected from the manholes and submerged the test pieces in those and determined the effect of corrosion. Then we took the most likely of these alloys as shown by the laboratory tests, and we made sheaths of those on full sized cables, and then we pulled those in and out of underground ducts, pulled them in and out eight or ten times, more severe service than they would ever get in actual practice, to determine whether they would hold up. And all those tests were continued, in comparison with the old style, three per cent tin sheath as a criterion of their behavior.

Q. Have you any idea how many people were engaged in that work and how much time was consumed in it?

A. No, except we were living with it four or five years, and there are at least three or four people from my department who were mixed up with it most of the time. And then we had the installation experiments, the pulling in and out, conducted by the associated company there in New York. And it is our practice when they do work of this kind for us that they are reimbursed for it. The expense of the Western Electric Company in connection with that was not billed to us, because they make the cable and their particular [fol. 7929] portion of the expense goes into the cost of the cable. It is a divided proposition the.

Well, some of this cable was put up on an elevated railroad structure. We picked a place where a branch line of the Elevated came into the main line, so that the structure was pretty violently shaken whenever a train went over it. And cables with the new sheath were placed alongside of cables with the old type of sheath, and there was a little electrical recording affair with air under slight pressure in the cables, so that when a crack opened, the air would be

released and a signal would be given, and we knew when the cable broke down. As a result of that we were able to recommend to the associated companies about 1912 and '13 the use of the sheath containing 99 per cent of lead and one per cent of antimony. That made a saving in the cost of the cables to the associated companies that has amou-ted from that time on up to December 31, 1921, which is the latest date I have these figures computed for, to about six million dollars to all of the associated companies.

I might say in that connection that had this 22 gauge cable not been developed and made available, and they had gone on using 19 gauge cable in 1921 in their plants, the entire plants of the associated companies would have cost nearly one hundred million dollars more than has been the cost today. The development of the 900 and 1200 pairs has made a reduction of nearly $9,000,000 in the whole system.

Mr. Dotson: The saving of six millions of dollars to the [fol. 7930] associated companies, is that reflected in the cost of producing the cable or the casement?

The Witness: That is in the lead sheath, yes. It means that those cables which they have now with one per cent antimony in them, if those cables had had three per cent of tin in them, the cost would have been $6,000,000 more than the actual cost has been to them.

Mr. Dotson: Did any savings of cost result to the benefit of the American Company? Did the American Company profit by that saving?

The Witness: A rather small portion, because the American Company has some cable in its Long Lines plant. But I should say in regard to all of these savings, it stands about like this. There is a great deal of our work, the work our Staff does, which does not benefit the Long Lines plant of the American Company directly at all, work we do on exchange construction, because the American Company does not own and operate any local exchanges. In the work that we do on toll line construction and on toll line transmission, and to the extent that the Long Lines use cable, those things are useful to it. But the entire Long Lines plant is considerably less than ten per cent of the entire Bell system plant and the benefit to the Long Lines Company is certainly no more than the relation which that Long Lines plant bears to the whole Bell system. Incidentally the Long Lines organization is quite independent, a

separate set of people entirely from these that are on [fol. 7931] these organization diagrams you see. The Long Lines has its own engineering department of 160 different people, entirely different people.

Q. Does it pay for its services?

A. Yes, it pays four and one half per cent.

Q. In the same way the associated companies do?

A. In the same way the associated companies do, yes.

Mr. McConnaughey: What are the savings figures of the 1200 pair cable?

The Witness: The 1200 and 900 pair cable, about nine million dollars. Now, quite recently, beginning about 1922, we arranged for the manufacture of cables in sizes of smaller than the 1200 pair, so that it developed a large use by the associated company of 24 gauge wires instead of 22 gauge wires in their plants and that is resulting in a saving of a million dollars per year to the associated companies in the cable which they buy, by getting 24 gauge instead of 22.

Q. Have you reached the end of the cable development yet?

A. No, we have not. We are now at work on cables with 27 gauge conductors, and I have here just one piece of a cross section of an experimental cable that we have made that has 1500 pairs of wires instead of 1200 in it, and we are hopeful of producing an 1800 pair cable at some time. Now, in that there are a good many factors to consider. There is the question of splicing such small wires, and we are conducting very careful splicing tests now to determine that. There are other methods to be worked out for applying the paper [fol. 7932] to the cable other than this taped wrapping we use now, and some very vital changes in the cable core, all of which we hope will lead to economies of the kind I mention.

Mr. Dotson: What is the cable core?

The Witness: Everything inside of the sheath.

Mr. Dotson: Inside of the sheath?

The Witness: Yes, sir. Now, a couple of years ago we decided that we could recommend to the companies that they use a little thinner sheath on some of the cables. We had previously been using on the larger cables a sheath that was one eighth of an inch thick and on the very small cables one twelfth of an inch thick, and on some of the intermediate

sizes 3/32. We had a lot of cable made up, pulled in, and handled rather violently, more severely, I think, I could say than cable is ordinarily handled in practice, these cables having sheaths on which, instead of reducing from the full size down by three steps, we put in a considerably greater number, which resulted in some of the cables having a sheath a few thousandths of an inch thinner than they were before. That work will save a couple of hundred thousand dollars a year in the associated companies' bill.

In mentioning these savings that have been made in the past I do not want to give the impression that we look upon the license contract payment in any way as a tribute or royalty for this work that has been done in the past, but I give the Commission these things because they are real examples of what this organization has produced and it is at [fol. 7933] work now on similar things, and we are confident that we are going to produce similar economies in the future from year to year to those that have been produced in the past. But these savings that have been made are an example of the proved capabilities of this organization to make these economies.

Mr. Dotson: To what extent are the associated companies obliged to retire existing cables when these improved cables are effected?

The Witness: As a rule it does not pay to take out cable that is in the plant. Under some conditions, such as along at the time of the War when copper reached a very high figure, there were instances where you could afford to take out in some cases 19 inch cable and replace it with 22. But these improvements apply to the new cables that are constantly added. The telephone system is a growing system, and they have to add all the time. Now, there are some situations where a subway containing a certain number of ducts will be crowded and if you did not have more wires you would have to build a reinforcing subway alongside of it; now, by pulling out a 400 pair cable and putting in a 1200 pair, you can there postpone expensive conduit construction generally. But in general it does not pay to take out existing cables.

Mr. Dotson: The thought I had in mind was whether there is any obligation resting upon the associated companies to [fol. 7934] accept these improvements as they are developed.

The Witness: No obligation on them to accept anything that they get under this license contract. What we do is to

tell them that here are these things we have made available and these are standard methods we have worked out carefully for doing these things; for similar processes we have saved so much; that these are the advantages of one as compared with the other. Now, the discretion of where to use those things rests in the associated companies.

Commissioner Marshall: Mr. Rhodes, the fact of the matter is that the parent company owning the subsidiary companies, they do adopt everything that is for the betterment of the associated companies, do they not? They are compelled to by virtue of the ownership and management.

The Witness: No, they are not compelled to. We have some very considerable debates sometimes within the family when the associated engineers come and they say they think this thing is best; we attempt to convince them; and if we do not, they can go ahead along their own lines. The men in all of the departments in the associated companies are men who are perfectly competent to decide what they need to do in the business, and they are not checked up. There is no compulsion about this. But if somebody operating those companies were to go ahead and do something that would be foolishly uneconomical, he would be remonstrated with, of course.

Commissioner Marshall: I apprehend he would not be competent, if he did not take advantage of the latest im-[fol. 7935] proved facilities.

The Witness: Yes.

Commissioner Marshall: I think there would be just as much incompetency in the parent company if they would let them do it.

The Witness: I think there would be if he did something that was obviously uneconomical. But we are dealing in many things with problems where the differences are pretty small and there may be a perfectly proper difference of judgment. But the point I wanted to make here was that there was no coercion in forcing the man in the field to do something which was against his judgment, particularly where the matter is a very small one.

Commissioner Marshall: So you won't misunderstand me, I went through this once a few years ago, and I was in favor of the four and a half per cent contract, believing that they got the benefit of the four and a half per cent or whatever they paid them. That is why I asked you if they were not compelled to. If you send all of these millions to develop the

telephone system, then they have the right to take advantage of it——

The Witness: That point has really never arisen in that way, and I do not think it would among reasonable people.

Commissioner Marshall: Well, that is all.

The Witness: That is, if there was a type of cable available which was just as good as some other type which cost ten per cent more, why nobody connected with the manage-
[fol. 7936] ment of the Ohio Bell Company would think of buying that cable that cost ten per cent more.

Mr. Dotson: The situation you alluded to might arise, however, in a case where the cable is improved as you have described and it may for that reason desire more than the cable that is in use, and yet the one in use is giving the service all right. Now, in that case is there any retirements that are required of the associated companies, because there is an improved cable which has been perfected and the American Company considers it especially useful and proper to be used in place of existing cables?

The Witness: Well, what happens is that when this improvement is made, they are advised of it and given the specifications for the cable and they find out what the costs are. Now, the local administration of the plant, if the costs and salvage value for the cable that is in there are such that they can pull out two cables and substitute one for it and come out ahead, they do it. It is a matter of providing the facilities. They, of course, wish to provide the cable conductors at the minimum cost. There is no word of instruction that is passed from the General Staff to these people that "You must pull out cables you have got here, and put in other cables to take their place."

Mr. Dotson: Well, in retiring cables for the purpose of installing the improved cable, how is that retired cable salvaged? Is there any way by which the American Company takes that over at a certain value?

[fol. 7937] The Witness: No.

Mr. Dotson: It must be junked?

The Witness: The point is this. If that cable has useful life, if it is in such condition that it can be reinstalled somewhere, the company will place it at some appropriate place in its territory. Bit if it has reached a condition of debility, where it is a source of trouble, they junk that and obtain the salvage cost. Does that answer the question?

Mr. Dotson: I think so.

And thereupon the further hearing of this matter was adjourned to Tuesday Morning, February 26th, 1924, at 10:00 o'clock.

[fol. 7938] Tuesday Morning, February 26th, 1924.

And also FREDERICK LELAND RHODES, resuming the stand for further direct examination, continued his testimony as follows:

Examined by Mr. Burr:

Q. At the close of yesterday's hearing, Mr. Rhodes, you had identified certain specifications prepared by the general staff and your department of the general staff particularly, covering certain kinds of cables. Will you describe briefly if you please the work of the general staff in connection with outside plant development? And I think it might be just as well to preface your answer by stating what you mean by "Outside plant development".

A. The term, "Outside plant" in the telephone business is applied to the portion of the plant between the subscribers' stations and the telephone central offices, and includes among the principal items underground conduits, underground and aerial cables and their appurtenances, pole lines and various types of wires.

By the term "Development" as applied to outside plant, we mean the continuous work that is conducted in developing the best types of materials and apparatus for the purpose, and the best methods of engineering and constructing the outside plant.

[fol. 7939] The outside plant is a particularly important portion of the telephone plant on account of the relatively large proportion of the cost of the entire system which is included in that term, "Outside plant".

In handling this subject from a design standpoint, what we seek to obtain is a plant of adequate strength and most suitably designed to insure the minimum cost during its life.

Now in studying the possibility of new improvements we not only conduct such laboratory tests as are necessary, but where useful we make full-size trials of proposed improvements, and frequently we conduct what might be termed accelerated aging tests. For example, to protect the iron and steel wires used in the outside plant, it is covered with a zinc coating known as galvanizing. There are numerous

processes for applying zinc, and when we are considering the possibility of one of these processes for example, we will in the laboratory expose specimens that are coated by the process under consideration in vessels containing water through which a current of air is blown. That is a situation which tends to increase corrosion very much. And we are able in the course of a few months to get results that are comparable with those that will be obtained after many years of exposure in the plant.

What I had in mind by "full size trials" could be illustrated by this. The design of pole lines, particularly with reference to the size of pole, of different kinds of timber [fol. 7940] which it is economical to install to carry a given load depends on the strength of the timber. Within the last year, we have been reviewing figures which are used for calculating the strength of poles, and in order to obtain that information we have — conducting breaking tests on full size poles, thirty and thirty-five and forty foot poles, some larger, of various kinds of timber in different portions of the United States. We have tested cedar poles in Minnesota, chestnut poles in Virginia, and we tested poles that came from the Carolinas and Tennessee. On the western coast, at Spokane we have conducted tests of cedar poles from that part of the count-y. This spring we are going to follow that up with some tests in the south on yellow pine poles.

Now there was a rather interesting result obtained with regard to the chestnut poles. We found that the chestnut poles are running a stronger grade of timber than we had been previously engineering upon. It seems that for the same class of duty we will be able to use smaller poles initially of that grade of timber, and the poles of that grade of timber that are in the plant will be allowed to remain a few years more. Just in the first cost of poles in the telephone system that will mean a saving of some three hundred thousand dollars a year in the first cost. It is on test work like that that the design of both our underground and overhead plant is based.

The expenditures for the overhead plant are worked out on the basis of careful engineering design, taking into [fol. 7941] account the load on the poles, due to wind and sleet on the wires, the strength of the wires as affected by temperature changes, and all other significant factors. T

result of that is that we are able to engineer the plant on a sound basis, and the conclusions from this work are reported in standard specifications which are supplied to the associated companies, and they are advised as to the most economical and effective measures to meet all of their various conditions. The expenditures are very carefully considered, and some of our specifications for various methods of work are the result literally of years of work on the part of a number of men. That results from the fact that there is almost always more than one way of doing the same thing in constructing the plant. There are usually — ways. Those are all carefully considered and their advantages and disadvantages compared, and some methods are eliminated, and finally the best ones are selected for the standards and then they are fully described and illustrated in hand books that the associated companies are able to place in the hands of their field forces for their guidance.

There are a good many of those hand books already issued and other subjects are in course of being taken up. I have brought a few of these as illustrations of the general set-up and arrangement of these specifications. Would you be interested, Mr. Burr, to have these put in as exhibits?

Mr. Burr: Yes. Number 3912——

[fol. 7942] The Witness: I haven't that here. The first one I have is 3913 for underground cable splicing.

Mr. Burr: That may be marked Rhode's Exhibit Number 16.

And thereupon the handbook above referred to was marked for the purposes of identification as Rhode's Exhibit No. 16.

Q. Have you Number 3914.

A. Yes, sir; that covers the splicing of aerial cables.

Mr. Burr: That may be marked Rhode's Exhibit Number 17.

And thereupon the hand book above referred to was marked for the purposes of identification as Rhode's Exhibit No. 17.

Q. Have you Number 3915?

A. Yes, that is for block cable splicing.

Mr. Burr: That may be marked Rhode's Exhibit Number 18.

And thereupon the hand book above referred to was marked for the purposes of identification as Rhode's Exhibit No. 18.

Q. Have you Number 3916?

[fol. 7943] A. Yes, sir, that is house cable splicing.

Mr. Burr: Let it be marked Number 19.

And thereupon the hand book above referred to was marked for the purposes of identification as Rhode's Exhibit Number 19.

The Witness: I might say the technique of splicing cables is different according as the circumstances under which the cables are used differ, and these contain detailed instructions for the splices, covering dimensions and methods, and we have found it advisable in preparing these hand books for the use of the field forces to have them rather completely illustrated, because the man who is conducting the work rather likes to refer to illustrations to guide him as far as possible, rather than to the test. The illustrations bear all the dimensions and it makes a ready means of reference.

Q. Have you handbook Number 3926?

A. These have not been identified.

Q. No, I will come to that a little later?

A. The next one I have is 3927 for guying pole lines.

Mr. Burr: It may be marked Rhode's Exhibit Number 20.

And thereupon the handbook above referred to was marked for the purposes of identification Rhode's Exhibit 20.

[fol. 7944] Q. What is the next one?

A. The next one I have is Number 3928 for open wire construction. I might say we use the term "Open wire" as applied to wires carried on insulators on pins and cross arms in distinction from wires that are enclosed in sheaths in cables. That is what the term, "open wire" means in the telephone business.

Mr. Burr: Let this be marked Rhode's Exhibit Number 21.

And thereupon the hand book above referred to was marked for the purposes of identification as Rhode's Exhibit Number 21.

The Witness: The next one I have is specification 3930 for drop wiring. The drop wires are the rubber covered wires extending usually from a cable terminal on a pole to the subscriber's premises.

Mr. Burr: Mark it Rhode's Exhibit Number 22, if you please.

And thereupon the hand book above referred to was marked for the purposes of identification as Rhode's Exhibit Number 22.

The Witness: The next one I have is 3933, house cable placing. That describes the best methods of installing cables in buildings.

[fol. 7945] Mr. Burr: It may be marked Rhode's Exhibit Number 23.

And thereupon the handbook above referred to was marked for the purposes of identification as Rhode's Exhibit Number 23.

Q. Have you Number 4010?

A. Yes, that is a specification for the operation of a cable reel trailer. That is a devise for picking up a cable on a pair of wheels, so that it can be drawn to the job behind a truck. It is very carefully designed in order to enable the cable to be raised up on these reels and suitably handled during installation.

Mr. Burr: Mark that Exhibit Number 24.

And thereupon the hand book above referred to was marked for the purposes of identification as Rhode's Exhibit Number 24.

Q. Have you one on first aid?

A. Yes. That is Number 4018. That I might say has been carefully prepared, acting under the advise of our medical director, who is studying methods of that kind, and it embodies the best information that we have as to rendering first aid by the gang in case of an accident on the job, and it is used in connection with the first aid kits of supplies which I referred to I think on yesterday.

Q. Does it cover more than one kind of accident?

[fol. 7946] A. Yes, it is intended to be applicable to all kinds of accidents that are liable to be encumbered on the job.

Mr. Burr: It may be marked Rhode's Exhibit Number 25.

And thereupon the hand book above referred to was marked for the purposes of identification as Rhode's Exhibit Number 25.

Q. What is the next one which you have?

A. The next one I have is 4032 for underground cable placing. It covers the precautionary measures to be taken to avoid accidents, the preparations for placing the cable, method of building the cable and the methods of drawing cable into subways and laterals and handling the cable at terminal points, and for withdrawing cables.

Q. Why is it necessary or advisable to have special instructions on a question of that kind?

A. Because, as I said before, there are several ways of doing the same thing, and the aim here is to make carefully considered and the best methods in each portion of the work available to the companies. These specifications are not fixed things that are made and allowed to rest for long period, but as may be necessary amendments are issued to them when improvements can be made.

Mr. Burr: That may be marked Exhibit Number 26.

And thereupon the hand book above referred to was [fol. 7947] marked for the purposes of identification as Rhode's Exhibit Number 26.

The Witness: I have another one, 4033, on the subject of tree pruning, so that where it is necessary to trim trees to prevent interference with the telephone wires, it can be done in the best way to avoid injury to the trees. And in preparing this, we consulted a number of skilled foresters and utilized their advice in the preparation of these inspections.

Mr. Burr: It may be marked Rhode's Exhibit Number 27.

And thereupon the hand book above referred to was marked for the purposes of identification as Rhode's Exhibit Number 27.

Q. What is the next one which you have?

A. Number 4039 cable terminating. This deals with the question of methods of making what are termed cable forms and general methods of so handling and preparing the cable that moisture will not enter it.

Mr. Dobson: Pardon me. May I ask a question?

Mr. Burr: Yes. Mark it Rhode's Exhibit Number 28 if you please.

And thereupon the hand book above referred to was marked for the purposes of identification as Rhode's Ex-
[fol. 7948] hibit Number 28.

Mr. Dotson: Exhibit relating to tree pruning——

The Witness: Yes.

Mr. Dotson: Isn't it a fact that most of the large cities in which you operate exchanges where tree pruning is necessary, the cities themselves, have forestry departments that have charge and control of pruning of trees in connection with public utility work?

The Witness: I think that is true, sir, in many of the cities, but there are also many places where it does not occur, and it is the desire to have the best methods followed in those instances.

Mr. Dotson: In cities where forestry departments are maintained, your company generally allows the tree pruning to be done under the direction and supervision of the cities forestry department in accordance with the rules and customs of that department.

The Witness: I think that is definitely so, although I am not absolutely certain as to the point, but it is the aim of the companies to follow local regulations wherever they exist.

Mr. Dotson: Then this service would not really obtain in cities where forestry departments are maintained.

The Witness: I think that might be so. I think it is true of these services broadly that they cover the entire operation of the plant. Some of them are more useful to certain companies than others. There may be a case where
[fol. 7949] this service of tree pruning would be relatively unimportant, for the reason you mention, but others of the specifications would be of great importance. And there may be some places where this would on tree pruning work be important.

Q. And it is very important when the pruning to be done is either outside a municipality or within a municipality where there is no such organization or department as the one referred to by Mr. Dotson?

A. I think that is true. I have three more of these if you care to have them introduced at the same time.

Mr. Burr: Yes, if you please?

The Witness: I have one, Number 4040, general specifications for the construction of jointly used wood pole lines carrying supply circuits and signal circuits. That covers the several methods of construction where it is possible to place certain classes of electric light and power wires and telephone wires on a common line of poles. There are some classes of power circuits that it is not wise to place on the same line of poles for safety reasons for telephone purposes, but there are other distribution circuits within certain voltage limits where that can be done and is done quite largely by the associated companies.

Mr. Burr: It may be marked Rhode's Exhibit Number 29.

And thereupon the hand book above referred to was [fol. 7950] marked for the purposes of identification Rhode's Exhibit Number 29.

The Witness: I have another one, specification 4102 on the subject of the operation of pole derricks. That is an example of something I referred to yesterday, where we are endeavoring as far as possible to economize on labor costs by the use of machine tools, and these derricks have been specially devised to go on automobile trucks and handle the cutting and moving and removing of poles. The hand book is completely illustrated, so that the apparatus itself and the method of using it is shown there.

Now I have just one more of the illustrated ones, specifications 4131, on the subject of the use of dynamite. Explosives are used in telephone construction in some instances in conduit construction, and in some cases for making the holes for the poles to set in. And these instructions were very carefully prepared and we had the advise of an expert on the use of explosives, in fact of more than one, and we feel that the best method from the standpoint of safety, both in transporting and using the explosives, is thoroughly covered.

Mr. Burr: Number 4192 may be marked for identification Rhode's Exhibit Number- 4-30, and Nu-ber 4131, Rhode's Exhibit Number 31.

And thereupon the handbooks above referred to were [fol. 7951] offered and admitted in evidence on behalf of the Ohio Bell Telephone Company, and are herewith submitted, marked respectively Rhode's Exhibits Numbers 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, and 31, and made a part hereof.

Q. Have you any other bulletins or specifications to which you can refer briefly, Mr. Rhodes?

A. I have. I have one other thought in connection with these handbooks that it might be desirable to state. The work of preparing these is done by the general staff, and initial copies are supplied to all the companies. Now they use these in their work in large quantities, and the quantities which they obtain are obtained from the usual supply sources at the cost of printing and paper. There is a real use made of these. In the last six years, the associated companies have obtained a little over a million copies of all these various kinds of hand books that are available, and they have obtained those for placing them in the hands of their field forces.

Q. Now they have not been sent to the associated companies in bulk, but the associated companies have sent in their requirements, and those requirements have been filled from time to time.

A. They obtain those from the supply house in the different parts of the country.

Q. And those requirements amount to more than a million as I understand you?

A. Of all of the hand books.

[fol. 7952] Mr. McConnaughey: What do you mean by "The usual supply houses" you speak of?

The Witness: Through the supply houses of the Western Electric Company in the company's territories.

Q. What period of time is severed by the million hand books that have been used?

A. Some——

Q. Well, it is not important?

A. Well, I would like to get it accurately. From October 1917 to December 31st, 1923. Now you asked me about information on outside plant matters in other forms, and I have a few instances. I have Bulletin Number 18 of the Department of Development and Research, dealing with

our investigations and tests covering a long period of years on the subject of butt treated poles. Butt treating is a method for impregnating butts of poles with preservatives to increase their life.

Mr. Burr: It may be marked Rhode's Exhibit Number 32.

And thereupon the hand book above referred to was marked for the purposes of identification as Rhode's Exhibit Number 33.

Q. Give examples if you please of some typical specifications. We do not want all of them, but just give some typical ones?

A. I cannot give all of them, because they run into hundreds, but I have some typical specimens here, specifications Number 3231 for creosoting yellow pine cross [fol. 7953] arms.

Mr. Burr: Let it be marked Rhode's Exhibit Number 33.

And thereupon the specifications above referred to were marked for the purposes of identification as Rhode's Exhibit Number 33.

The Witness: I have also specifications 3254 for eastern white cedar poles.

And thereupon the hand book above referred to was marked for the purposes of identification as Rhode's Exhibit Number 34.

Mr. Dotson: May I ask when this bulletin identified as Number 32 was issued?

The Witness: I think it bears its date.

Mr. Dotson: April 15th, 1921; is that the date?

The Witness: If that is the date on it, that is the date when it was issued.

Mr. Dotson: Is that the only bulletin ever issued on the treatment of the butts of poles?

The Witness: I should say not, there were more. We have been investigating the subject of the treatment of poles for a period of nearly 30 years. We set our first experimental line of creosoted yellow pine poles in the year 1897, and we have been following the subject very carefully and [fol. 7954] thoroughly since that time. In many parts of the country we have set experimental poles, I mean by that, poles treated in different manners, and we have set those

poles alternately with untreated poles, and after they have been there a sufficient length of time, so that there is decay you know in the untreated poles, periodically thereafter our engineers from the general staff at periods of three years examine the poles and make measurements of the progress of decay, so that we will obtain quantitative results indicating the benefits from the treatments. Now we have from time to time in the past advised the companies with regard to treatments and furnished them with specifications for the treating of poles. This particular bulletin reviews the experimental work over a period of fifteen or twenty years and puts the associated companies in possession of the results which have been obtained by preservative treatments.

Mr. Dotson: Then the experimental period has extended over a period of about fifteen or twenty years?

The Witness: Yes, sir, rather more than that.

Mr. Dotson: When this bulletin was issued, it was the first time you had arrived at sufficiently definite results on treatment of this character to enable you to issue a bulletin definitely setting forth the results.

The Witness: That is not quite the fact.

Mr. Burr: He did not say that.

Mr. Dotson: I am asking if that is it?

The Witness: No, that is not quite the fact. This is a [fol. 7955] more complete bulletin that we were able to issue before for the reason that we had no more facts and the progress of time has gone on and given us an opportunity to observe. For instance, to mention one specific case, in 1915 one of my assistants dealing with this subject and myself prepared a joint paper on the subject of the recent results obtained from the preservative treatment of telephone poles. You see as time goes on our data becomes more complete naturally.

Mr. Dotson: Naturally, yes.

Q. So this is not the first printed article on the subject?

A. No, sir.

Mr. Dotson: Well, your printed articles heretofore were simply comments upon experiments made and not a definite set of instructions as to the treatment of poles before setting them.

The Witness: I cannot quite agree with that either, because they have had complete instructions many years ago

as to not only how to conduct the preservative treatment, but as to the results obtained.

Mr. Dotson: Well, the experiments you made were such experiments as were being made generally over the country in other lines of business where poles were being used? For example, ties for railroads, railroad ties, have undergone exactly the same line of experimentation as to the preservation of their lives as the ones you have given your poles.

The Witness: I can agree with you in part. As far as [fol. 7956] the tie question is concerned, of course the problem of the railroads has been rather different from the problem from the telephone company. In the tie situation, there are two conditions as I understand it limiting the length of the life of the tie. One is the decay pure and simple and the other is the mechanical wear of the tie due to the impact of the rail, so that the railroads have not found it necessary or advisable to treat their ties as fully as we have the butts of telephone poles. That is, it would be inadvisable to obtain a length beyond that when the tie is taken out because of the conditions of mechanical wear. Now as to the completion of the experimentation on the poles, the United States Forest Service has joined with us in some of the tests on account of the extensive facilities we have had for trying to do some of these experiments, and I do not know of any other utility that has conducted experiments on the life of poles that would compare in any way with the completeness of the work that we have carried out.

Mr. Dotson: What kind of treatment have you adopted for the various companies, associate companies?

The Witness: We have recommended a statement with what is commonly called creosote oil. Its technical name is dead oil of coal tar, and the treatment that is carried on at the present time on the butts of the poles is what is known as open tank treatment. The poles are immersed perhaps up to a foot above the ground line in dead oil of [fol. 7957] coal tar, which is heated, and after a certain number of hours in that tank, they are transferred to a tank of cold oil, or the hot oil is run out and cold oil run in, and the effect of that is to condense the vapor in the pole, and the atmospheric pressure tends to force the oil into the pole.

Mr. Dotson: That is the same method by which they creosote ties for railroads?

The Witness: Yes, they do. I do not want to give an impression that this is a process that is patented or controlled by us in any way. Our situation was this. We were in a situation where we wanted to advise the associated companies as to the methods to employ in their work, and that is what we have undertaken to do and have done.

Mr. Dotson: You have profited of course by the experiments of others in similar lines.

The Witness: We have followed what other people have been doing, but our recommendations are based upon our own experiments.

Mr. Dotson: Your experiments and investigations.

The Witness: Yes.

Mr. Burr: Bulletin Number 2321, if not already marked for identification, may be marked 33.

Mr. Kinnisson: Does your general staff make any check to determine the degree to which this information is utilized by your associate companies?

The Witness: Nothing formal on the subject, no. Of [fol. 7958] course our men are in the field, visit the associated companies frequently, and these matters are all matters of discussion at those times, and when the engineers of the associated companies come to headquarters they are discussed, but there is no formal follow-up method. Our people in the field operating these companies are engineers of a high grade of intelligence, and when they get this information they know how to use it to their best advantage.

Mr. Kinnisson: Do you compel the adoption of suggestions sent out in your hand books?

The Witness: No, sir, it is an advisory service.

Mr. Kinnisson: Entirely.

The Witness: Yes, sir. While we are on this subject, I brought out a copy of specifications 3744, which are specifications for the analysis of dead oil of coal tar or coal tar creosote.

Mr. Burr: They may be marked Exhibit Number 35.

And thereupon the specifications above referred to were marked for the purposes of identification as Rhode's Exhibit Number 35.

Q. You may proceed now.

A. The next one is specification 3838 for Douglass fir cross-arms.

Mr. Burr: Mark it Rhode's Exhibit Number 36.

And thereupon the specification above referred to was [fol. 7959] marked for the purposes of identification as Rhode's Exhibit Number 36.

The Witness: 4114, specification for exchange insulators.

Mr. Burr: Rhode's Exhibit 37.

And thereupon the specifications above referred to were marked for the purposes of identification as Rhode's Exhibit Number 38.

Q. To interrupt you a moment, Mr. Rhodes, isn't it true that in investigating various methods to be employed or proposed to be employed and recommended to the associated companies, and in investigating the various types and classes of plant in the laboratories of your department, you go to the trouble of simulating weather conditions in various parts of the country as near as possible in order to determine the particular adaptibility of one kind of apparatus or another to a particular locality, including the State of Ohio?

A. Yes. As an example of that, we have conducted a rather exhaustive series of tests on switch board cords in a room where the atmosphere was maintained at a high humidity. The ability of German silver springs to withstand and repeated bending has been determined in rooms at a low temperature, where the metal would have the best opportunity to tend to become brittle. In fact, on this question of timber, we maintain what we call the [fol. 7960] fungus pit which is a room where the temperature and the humidity is maintained at values favorable to decay of timber, and specimens of timber, treated with various forms of preservatives, are placed there and are innoculated with a decay producing fungus in order to attempt to obtain accelerated tests on the value of preservatives. Those tests are not conclusive, but they are a very reasonable indication of the relative values of different tests of preservatives.

Mr. Dotson: You do not claim they are conclusive tests, even as to atmospheric conditions.

The Witness: No, those particular tests are not.

Mr. Dotson: And they do not demonstrate anything with reference to soil conditions or chemical conditions of the soil where poles are placed.

The Witness: To that extent, as I say, they are not complete and final, but they are a useful preliminary indication. We depend for our final recommendations in regard to this matter of treatment on actual poles installed under conditions of use and carefully followed up.

I have another specification dealing with the matter, dealing further with the matter, of the preservative treatment of poles. This is specifications Number 4122, provisional specifications for the perforation treatment of poles.

It might be interesting to know a little something about that. There are some kinds of timber, cedar particularly, that it is rather difficult to force the preservative into the timber, and therefore it has been found advisable to me- [fol. 7961] chanically perforate the butt of the poles, with the perforations extending in perhaps an inch, which allows the oil to enter the pole, and then circulate in the wood, parallel with the long axis of the pole. I would like to say in connection with that that is not a process which we control, but it was I think first suggested by a Hungarian engineer many years ago. And at that time we set an experimental line of poles that had been perforated and treated. We set those in the south in order that the results could be obtained as soon as possible, because decay proceeded more rapidly there, and the results obtained on that line were a portion of the things that we availed ourselves of in making these recommendations.

Q. What department bore the expense of this enormous amount of experimentation and what one does it now?

A. It is done now by the department of development and research. Before the departments were separated in 1919, as I told you yesterday, It was done by the engineering department, and of course we bear all of the expense of sending our engineers out around the country to make these periodical measurements on these experimental poles, and we have also to take men along to excavate around the poles, and of course we bear the expense of that also.

Q. The entire expense is borne by the American Company?

A. The expense of making all these observations yes.

Mr. Dotson: All of that expense is finally covered by the licensee revenues.

[fol. 7962] The Witness: That is a portion of the services performed unde- the license contract, yes.

Mr. Dotson: The question is, all of that expense is finally covered by this license revenue.

The Witness: As I said yesterday, I do not know that these particular dollars go for that particular purpose.

Mr. Dotson: I mean in amount; the revenue is sufficient.

The Witness: Generally that is true.

Q. It is if the license revenue payment in general is large enough to cover the total expense?

A. I think that is a very fair way of stating it.

Mr. Dotson: My question is, it does cover it? You have the records to show it.

The Witness: I don't know anything further about that except that statement I read from the 1920 annual report, which indicated that the expense ran from 14 to 16 million dollars as against a payment of 17 million.

Mr. Dotson: Outside of that knowledge of yours, of course the records would disclose whether that is the fact or not? I say outside of your personal knowledge, the records of the company, the American Company would show whether the revenues from the license contract have been sufficient to cover the total cost of these experiments.

The Witness: I don't know as to that. Of course the facts are in the records but the allocation of that expense involves a prorating on a series of assumptions.

[fol. 7963] Q. You could not determine it accurately could you?

A. I beg your pardon.

Q. It would not be possible to determine it accurately?

A. I do not see how it could be determined and I do not see how it could be prorated among the companies.

Mr. Dotson: I am speaking now with reference to the budget of expense of the general staff as a whole.

Chairman Poor: Disregarding the department subdivisions?

Mr. Dotson: Your records will show the total revenues of the general staff derived from the license contracts? That is what I am assuming.

The Witness: I cannot tell you that in detail, because I am not familiar with the accounts. As I told you yesterday I know the budget of my own department.

Mr. Dotson: My question only referred further to the total expense account of the general staff, not of the different departments as so organized.

The Witness: I cannot tell you as to that because I am not familiar with the accounts.

Mr. Kinnisson: In the absence of a check back to determine the degree to which this information is used by the ass-ciated companies, how can you approximate its value.

The Witness: Well, take the case of some specific item. I mentioned yesterday the saving from the use of lead-antimony cable sheath. That was made up from a knowl-[fol. 7964] edge over a period of years when that sheath was first put into use of the total amount of antimony which had been bought for use in cable sheaths by the manufacturer, the Western Electric Company, and knowing the total amount of anitmony that had been bought, I was able to find the amount that had gone into the sheaths.

Mr. Kinnison: I was referring more particularly to the information you introduced as Exhibits here this morning, the dissemination of those as the result of your research work.

The Witness: Yes.

Mr. Kinnison: How can you determine the value of that?

The Witness: We can determine what the savings have been from the new type of plant over—would have been the cost of the plant on the old basis.

Mr. Kinnisson: Whether they use it or not.

The Witness: We know they have utilized it.

Mr. Kinnison: Then you have checked back?

The Witness: No, not by check. I know the companies which have been using the three per cent of tin, because they made a saving of somewhere from eight to ten per cent by adopting the antimony sheath.

Mr. Kinnison: That is one particular instance. I am referring to these subjects this morning, the dissimination of information as a result of your research work.

The Witness: Yes.

[fol. 7965] Mr. Kinnison: You do not check it.

The Witness: We have no formal check-up.

Mr. Burr: Mr. Kinnison, by later witnesses we will show

the value of the services to the Ohio Bell company. That is what you are trying to get at.

Mr. Kinnison: Yes.

Mr. Burr: We will show that by other witnesses.

Mr. Laylin: May I ask a question right there, Mr. Burr?

Mr. Burr: Yes, glad to have you.

Mr. Laylin: With reference particularly to these exhibits which have been introduced this morning, I note that they are referred to as A. T. and T. specifications; is that not true?

The Witness: Yes, sir.

Mr. Laylin: Are they a compulsory specification for the benefit of the A. T. and T. employees; in other words, on your Long Lines, are they compulsory?

The Witness: No more so than in a case of an associated company. That is, the long lines is organized similar to an associated company, with its own staff of employees, and they have their own engineering department, and this information is available to them just the same way it is to the associated companies.

Mr. Laylin: But there would be no definite way of determining would there the relative degree in which this information is valuable to the A. T. and T. Long Lines as compared with the associated companies.

[fol. 7966] The Witness: Only as I said yesterday; out of the total plant of the Bell system the Long Lines plant is somewhere between five and ten per cent; I should say off hand, roughly, it is about six or seven per cent of the entire plant of the bell system. Some of the work we do is valuable to the long lines in that proportion, that is, six or seven per cent of the benefit of it would go to the Long Lines, but in much of the work we do that applies to exchange construction methods, the A. T. and T. Long Lines would make no use of that.

Mr. Burr: I think Mr. Laylin was out of the room yesterday when Mr. Rhodes stated that the Long Lines pay four and a half per cent for the services in exactly the same manner that the associated companies do.

Q. Have you any other specifications to which you wish to refer?

A. I have a half a dozen more if you wish to put them in. They are in substantially the same form as these other exhibits.

Q. I would like to have you identify a few more of them, because one or more of them from time to time seem to promote a discussion which brings out the character of the services and perhaps suggests questions to some of the gentlemen in the room, which questions we are glad to have them ask?

A. Specifications Number 4135 for copper wire.

Mr. Burr: Mark it Rhode's Exhibit Number 40.

And thereupon the specifications above referred to were [fol. 7967] marked for the purposes of identification as Rhode's Exhibit Number 40.

The Witness: Specifications Number 4144 for Type B drop wire.

Mr. Burr: Rhode's Exhibit Number 41, Mr. Walcutt.

And thereupon the specifications above referred to were marked for the purposes of identification as Rhode's Exhibit Number 41.

The Witness: Now, there is a case where the original rubber covered copper wire employed conductors of hard drawn copper. By utilizing a conductor of steel covered with copper, it was possibly to obtain the same tensile strength by means of a smaller wire, which was cheaper for the associated companies. This particular specification covers the drop wire in which the conductors are bronze, and under usual market conditions that proves in over the steel copper conductor in a rather interesting way for the reason that the metal in the copper-steel conductor had no salvage value practically when the wire has to be abandoned, whereas in the bronze wire the metal has a considerable salvage value, so the annual cost of the bronze under present conditions and conditions that have obtained for some time is less than the copper steel. The saving when that was put into use along in about 1921 was about [fol. 7968] $175,000.00 the year to the associated companies.

Q. What department made the investigation or discovery from which those results were obtained?

A. That was done in the department of development and research of the general staff.

Q. You may proceed?

A. Specifications Number 4180.

Mr. Burr: Rhode's Exhibit Number 42.

And thereupon the specifications above referred to was marked for the purposes of identification as Rhode's Exhibit Number 42.

The Witness: Specifications for a guy clamp that covers a guy clamp of greater holding power than the clamp that had preceded it, and it means that under some conditions in high strength strand that it is possible to hold the strand by means of two clamps where there formerly were three clamps employed. Specifications 4209 for creosoted yellow pine poles.

Mr. Burr: Let it be marked Rhode's Exhibit Number 43.

And thereupon the specifications above referred to were marked for the purposes of identification as Rhode's Exhibit Number 43.

[fol. 7969] The Witness: And specifications 4213.

Mr. Burr: Mark it Rhode's Exhibit Number 44.

And thereupon the specifications above referred to were marked for the purposes of identification as Rhode's Exhibit 44.

The Witness: For wooden insulator pins. Before leaving this subject of outside plant, as long as the question is taking the form of some inquiries about poles, it might be worth while *that* state that ten or a dozen years ago we made and put in service about 500 re-enforced concrete poles. Now the purpose of that experimental trial was not that we had any hope that under present price relations of materials that there was any immediate opportunity for using re-enforced concrete poles economically in the telephone plant, we did not, and the associated companies did not, know about the behavior of re-enforced concrete poles. We did not know what would be the effect of frost or lightning on the poles. These poles were made and some of them were weather-proofed by various methods. The behavior and condition of those poles *is* being followed up. Now the purpose of that work, characteristic of one phase of our work in general is this, that in the future price conditions may be such —You see the price of wooden poles is rather continuously going up—Price conditions may be such that the associated companies will wish to consider the use of re-enforced poles, [fol. 7970] and we wish to have this experiment behind us, covering a long period of years of service and observation,

so that we will be able to advise them on the basis of actual experience as to the best type of re-enforced concrete pole to use if they desire to use them.

Q. Are any of those poles in Ohio?

A. I think not. Now this work, like all of the work I have talked about, is a continuous and continuing thing, and is going on actively right now. We have for two years past been collecting experience in the plant with a still cheaper type of drop wire, in which the two rubber covered wires are enclosed under a common braid, instead of having each wire covered by the braid. That is going to save close on to $200,000.00, and it will be recommended very shortly now to the associated companies, and arrangements made to enter into the commercial production of that type of wire.

In connection with it, we have been conducting a series of experiments on some special forms of outside braid for that wire, made up of threads and lay-s of the thread, which have a considerably higher wearing power, power to resist abrasion.

The purpose of that is this. These drop wires in many parts of the country have necessarily to go through trees, and the present practice is to place a mechanical protection outside of the wire, some form of tubing that resists abrasion. There are many conditions where although this particular braid will be more expensive in the first cost than [fol. 7971] the wire without it, it will be less expensive than the wire plus this tube protection. We tested a great many types of braid to determine its ability to resist abrasion. We found on one particular series of tests that whereas the braid we used in the past would withstand about 20,000 rubs, that the best type of device in this newer and more expensive type of braid would withstand over two million, that is, a hundred times as many rubs, and was still in excellent condition after the two million. We have had some of this out in a portion of the plant where the life of the ordinary drop wire, on account of the abrasion from limbs of trees, was about four months, and after about two years, this type that I am talking about now was found to be in an excellent condition. That is just one example of pending work that is going on now.

Q. What kind of study if any do you make before at-

tempting some of the things covered by these specifications and by your testimony as having been done by your department?

A. Well, if I get what you mean, we do not enter into the work on a problem of any of these kinds just for the sake of keeping our people busy, but we do look to see where there is an opportunity for large saving to be made in the plants of the associated companies, and those are the problems that we attack.

Q. That is what I had in mind. You testified here in Ohio some three years ago on the subject of the services rendered under the license contract. Am I correct in my understanding that the work of the department has been [fol. 7972] going on since that time and that much has been accomplished as the result of the development and research work for the three year period, and that the work is still going on?

A. It certainly has and it is going on, yes.

Mr. Burr: We offer Rhode's Exhibits 32, to 44 inclusive, in evidence.

And thereupon the paper writings above offered were admitted in evidence on behalf of the Ohio Bell Telephone Company, and are herewith submitted, marked respectively Rhode's Exhibits Numbers 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, and 44, and made a part hereof.

Q. Describe, if you please, the work done by the general staff in the development of methods for guarding telephone lines against the disturbances from high tension wires?

A. That has been for a great many years a very important subject of investigation, not only from the disturbances caused by high tension wires paralleling the telephone lines, but also we have a continual consideration of prevention of overhearing from one telephone circuit to another.

Now the importance of that line of work arises from the fact that the telephone is the most delicate and sensitive electrical instrument that there is. I mean by that that the voice currents which operate it are the feeblest currents used in the electrical art. Now that statement by itself may not mean very much, and in order to get an illustration of [fol. 7973] that, I asked one of our engineers to make a calculation for me, which shows the energy required to vaporize a drop of water is sufficient to make a telephone receiver give out an audible sound for at least a million years. That

gives some little measure of the sensitiveness of the instruments and the feebleness of the current we are dealing with.

I mentioned yesterday that in the early days the telephone lines were subject to what were then rather mysterious disturbances. There would be all sorts of whistling and snapping sounds on the line. That came partially from atmospheric electricity and partially from induction from neighboring telegraphic circuits. With the introduction of electric light, these disturbances were so multiplied that a remedy had to be found or the extension of the telephone service would have been impossible. The general staff has worked continuously ever since in developing methods of transposition, that, is, interchanging the position of wires at intervals along the line with respect to each other and with respect to the disturbing circuits. With each new development of electric light and power and railway circuits, our difficulties have changed and new types of troubles have appear-d and have had to be contended against.

There has also with the use of very high tension power transmission lines arisen questions of hazards to the telephone service. I might say that when the single phase alternating current electric railway method of operation was [fol. 7974] introduced, in which the electrification of the New York, New Haven and Hartford railroad was one of the principal early cases, these disturbances came up in very exaggerated form. The telephone circuits within several miles of that railroad were seriously interfered with. A very highly balanced telephone cable in a conduit laid under a highway paralleling the railroad had enough voltage introduced through space in its wires to operate an ordinary electric light. That required joint work with the railway engineers and the experts of the manufacturing companies and an arrangement was worked out whereby that trouble was very greatly minimized, so much that the operation of the telephone lines could go on.

The question came up in regard to this interference on the Pacific Coast. It came to the attention of the State Commission in California, and a committee was formed under the auspices of the State Association, on which were representatives of the Commission, of the power companies, of the telephone and telegraph companies. The associated company in that territory called on the general staff to direct the telephone part of the investigation on its behalf. We had a representative of the general staff on the Pacific Coast

for a period of five years, and another of our men made trips out there and stayed for six and nine months at a time. The general staff shared in the expense of the committee. There was other work growing out of that, and the results obtained have been to the benefit of all the associated companies.

[fol. 7975] In connection with this transmission end of our work, which is concerned with transmitting the quality of the voice as nearly unimpaired as possible, and directing the design of the plant to that end, so that the transmission will be loud and clear, the art has progressed very rapidly in comparatively recent years. It seemed advisable to offer the associated companies an opportunity of letting their transmission engineers have the last word on this subject, and arrangements were made to conduct in New York what, for lack of a better name, we called a transmission school, where the transmission engineers of the associated companies were invited to come during the year 1920 and they were given lectures and an opportunity for laboratory work. Three terms were given during the winter of 1920 and '21.

The courses were conducted by staff engineers and dealt with the elements of telephone transmission on theory, laboratory work, and courses in the practical operation of repeaters and carrier current systems; another course dealing specially with these inductive interference matters, on which a great amount of recent work has been done, was given later than this, during the winter of 1922 and 1923. That course was attended in all by 112 representatives of the associated companies and covered a period of three months. Now in both of those schools I believe there was somewhere from six to eight representatives of the Ohio Bell Company who attended them and got the benefit of that information. There are of course a great many more men connected with [fol. 7976] the Ohio Bell Company to whom it is valuable to give that information, and the purpose was that these selected men who came there and got that information were enabled to come back to the company and give courses themselves within the company, whereby that information was passed out to a large number of employees in the Ohio Bell Company.

As long as we are dealing with that subject of inductive interference, I have a typical circular whereby the latest information with regard to schemes for transpositions of wires have been given to the associated companies. This

was prepared somewhat less than a year ago and is contained in a circular letter, Number 1261, which transmits notes on transposition practices, and the pictures which are given in this of the transposition diagrams will serve to illustrate methods that are followed, not the physical methods of constructing transpositions, but the location of these transpositions, and give some idea of the complexity of the idea of the work.

Perhaps I can give a still better idea of the complexity of it by saying that the design of two kinds of transpositions sections worked out by the general staff required a total work of seven hundred man days in order to go over the various possibilities, eliminating the more complex ones, and finally arriving at the simplest form to accomplish the result. This, Mr. Burr is the exhibit of transposition practices.

[fol. 7977] Mr. Burr: That may be marked Rhode's Exhibit Number 45, which is Number 1261. We offer Exhibit Number 45 in evidence.

And thereupon the pamphlet above referred to was marked for the purposes of identification and was offered and admitted in evidence on behalf of the Ohio Bell Telephone Company, and is herewith submitted, marked Rhode's Exhibit Number 45, and made a part hereof.

Q. Tell briefly something of the protector work carried on by the general staff for the benefit of the associated companies.

A. It has been necessary to devise protective apparatus to be place- both at the subscribers' stations and at the central offices to protect against lightning troubles and to arrange so that — event of an electric wire becoming crossed with a telephone wire, that the circuit will be cut off at the protector so as not to injure or kill the telephone user or to set fire to his house, and in the same way to protect the central office.

Very briefly, we have followed that matter up for a great many years, experimenting and devising the best forms of protectors. Comparatively recently in 1919 or 1920 an improvement was made in the form of protector blocks used at the sub-stations, where, instead of a pair of carbon blocks, separated by a mica separator, a porcelain block was used. In plain language the effect of that was to minimize the troubles caused at the protector by lightning storms. With

the old type, after a lightning storm, a great many sub-sta-
[fol. 7978] tions would be in trouble, due to the protector having short circuited the line. This form of protector that was devised was equally efficient as a protector and it very appreciably reduced this maintenance trouble at the time of lightning storms. The protection at both the sub-station and the central office is described in a series of hand books of the same nature as the hand books that have already been introduced through me. And the first of these that I have is specifications 3881.

Mr. Burr: Mark it Rhode's Exhibit Number 46.

And thereupon the handbook above referred to was marked for the purposes of identification as Rhode's Exhibit Number 46.

The Witness: Main frame protection for what are known as B type frames. Specification 3882, main frame protection for A type frames.

Mr. Burr: Rhode's Exhibit Number 47.

And thereupon the hand book above referred to was marked for the purposes of identification as Rhode's Exhibit Number 47.

The Witness: Specification 3918, sub-station protection.

[fol. 7979] Mr. Burr: Rhode's Exhibit Number 48.

And thereupon the handbook above referred to was marked for the purposes of identification as Rhode's Exhibit Number 48.

The Witness: Specifications 4157, cable protection.

Mr. Burr: Rhode's Exhibit Number 49.

And thereupon the handbook above referred to was marked for the purposes of identification Rhode's Exhibit Number 49.

The Witness: Specification 4170, sub-station and branch exchange protector installation.

Mr. Burr: Let it be marked Rhode's Exhibit Number 50.

And thereupon the handbook above referred to was marked for the purposes of identification as Rhode's Exhibit Number 50.

The Witness: Before leaving this subject of outside plant safe construction, I might say that we have another handbook, specifications 4190 on the subject of railroad crossing.

Mr. Burr: Mark it Rhode's Exhibit Number 51, if *if* you [fol. 7980] please.

And thereupon the handbook above referred to was marked for the purposes of identification Rhode's Exhibit Number 51.

The Witness: That is prepared by our department of operation and engineering and is the continuation of some work that was first started many years ago. It is desirable to take precaution where telephone lines cross railroad rights of way so as to minimize the danger of wires falling and interfering not only with men riding on freight cars, but also with the operation of the railroad signal systems. We found that almost every railroad had some requirements of its own, and a foreman going out with the gang to build a telephone line would come to a railroad and he would have to find out what the requirements at that crossing were, and then perhaps a mile further along he would come to another railroad and he would find that those requirements were different and he would have to send back for some different material to use, and so on. It was rather a complex and to some extent wasteful operation. We took steps to arrange for a joint committee meeting, first with representatives of the railway superintendents' Association. The work has since been built up through the American Railway Association, and the result is we have prepared standard specifications applicable to railroad crossings, which are generally adopted by the railroads and by the telephone companies and one method has been adopted [fol. 7981] to replace the great many that were in effect before that time.

Q. Now isn't it true that certain standards have been adopted by the Public Utilities Commission of Ohio?

A. I think very likely. I know they have by many.

Mr. Burr: I suppose counsel will take my statement for the fact that, pursuant to a recent enactment of the legislature, this Commission has adopted the most exhaustive specifications covering the matter of protection of telephone wires in conjunction with high tension wires and the matter of inductive interference and the crossing of railroads

by wires and various kindred subjects. If there is any question about it, I will give a definite reference to the statute and to the commission administrative order.

Q. You may state, Mr. Rhode's whether or not any of the men connected with the general staff and with your department worked on the matter just described here in the State of Ohio?

A. I understand that two of the representatives of the general staff came here to assist the officials of the Ohio Bell Company at the hearing and place at their disposal the special experience that they had accumulated by working on that problem for a great many years here and in other places.

Mr. Burr: We offer Exhibits 46 to 51 inclusive in evidence.

And thereupon the paper writings above offered were [fol. 7982] admitted in evidence on behalf of the Ohio Bell Telephone Company and are herewith submitted marked respectively Rhode's Exhibits Numbers 46, 47, 48, 49, 50 and 51, and made a part hereof.

Q. What does the general staff do if anything in regard to the protection of underground telephone cables against electrolysis?

A. We have always kept the associated companies advised and have furnished them consulting advise in special cases where electrolysis troubles had been experienced. The term "electrolysis", I might say, is applied to the destruction of underground metallic structures by the return current from railway traction systems. I mentioned yesterday that the general staff has had representatives serving since 1913 on the American Committee on electrolysis, where a large number of utility associations are co-operating, in seeking the best methods of mitigating electrolysis, and particularly attacking the problem at its source by reducing the amount of spray current in the earth. In that work, as in a number of lines of work, instead of the associated companies all over the country being required to send representatives to take over any committee work of that kind, the general staff is in a position to act for all of the associated companies.

And thereupon a recess was had until one thirty o'clock P. M. of same day. (Tuesday, February 26th, 1924.)

[fol. 7983] Tuesday Afternoon Session

February 26th, 1924.

And also FREDEIK LELAND RHODES, resuming the stand for further examination in chief, continued his testimony, as follows:

Examined by Mr. Burr:

Q. Mr. Rhodes, what services does the General Staff render in connection with building plans and what work does the staff do on that subject?

A. Very briefly it prepares efficient and economic building floor plans, so that the building will be designed with reference to making the building fit the equipment, rather than force the equipment to fit the building. It participates on the request of the associated companies in planning new buildings and extensions to existing buildings, and advises as to the desirable size and shape of lots of land for specific building projects, so as to give them economical arrangements of apparatus in the building. It recommends fire prevention means and plans, and also advises on fire protection apparatus, and it advises regarding the maintenance of buildings, that is, there is on the Staff a division of people who are skilled and experienced in telephone buildings. They do not deal with these buildings as an architectural proposition but as an equipment proposition.

[fol. 7984] Q. There are characteristics peculiar to the construction of telephone buildings, are there not?

A. Oh yes, there are such matters as arranging the equipment, so that it can be economically operated and maintained, the question of the air supply for the operating rooms, the question of floor strength in order adequately to hold the apparatus. The matter of future expected changes in the pipe and weights of apparatus have to be taken into account, and suiting the building to the arrangements of the cable runs between the frames and apparatus in the equipment.

Q. What has been done by the General Staff on the subject of the development of switchboards? I do not care to have you go into that in detail, but I would like to have you answer the question in a general way if you will.

A. I will answer it very briefly. Since the early days of the business the question of the types of switchboards and

the details of switchboards have been a matter that has been constantly studied. Throughout the operation of the manually operated board there have been such steps as the development of the multiple principle, whereby each subscriber's line is so placed that every operator can have access to it. Associated with that is the question of the busy test so that a subscriber will not plug in on a line which is already in use. Now, those principles, the multiple principle and the busy test principle, have survived in all forms of manually operated boards and in the so-called automatic boards as well.

[fol. 7985] One important step in the development of the manually operated board was the development of the common battery system, whereby the local batteries at each subscriber's station were done away with and the energy supplied from a storage battery at the central office. The development of that principle was worked out by the General Staff.

Then some fully fifteen years ago the question of the development of the so-called automatic switchboards was taken up. There was a form that was devised outside the Bell system, the Strober system or step by step system; and other type of automatic, the panel type, was developed within the system. Of recent years both of those types are employed. The equipment for the step by step is now made for the Bell system by the Automatic Electric Company, and they are making the apparatus to specifications made by the General Staff, and some real improvements have been made in the step by step mechanism, due to the work of the Staff. A very important development has been made in making arrangements whereby manual boards and automatic boards can be operated together in the same exchange area.

Mr. Dotson: Who made those developments?

The Witness: The General Staff. That included both the call indicator and the key indicator arrangements whereby the calls can be readily transferred.

Mr. Dotson: Is that method used by independent companies where they unite the automatic and manual in one system?

[fol. 7986] The Witness: I don't know of any instance where it has been used by independent companies.

Mr. Dotson: Is there any other method in use than the one——

The Witness: Yes, there is the method of going through an intermediate operator. The general tendency of switchboard development all through the manual board was to increase the features of the connections that were performed automatically, that is, the manual board has a great many functions that are performed automatically. When the subscriber takes his telephone off his hook, it automatically operates the relay and lights a light, and when she inserts the answering jack, it automatically extinguishes that light. And there are automatically operated signals in the cord circuit. At the other end of the line is what is called the full automatic, where, as everybody knows, the subscriber controls the connection by means of the dial.

Between those two there is sort of an intermediate zone where, if you take away from the operator the supervisory functions, you can make the operator still more of a machine than she is at the present time by adding equipment to the switchboard; and there is a zone in there where there is a very nice adjustment as to which is the most economical thing to do. You can save operating labor by enabling the operator to have more calls, but to do that you have to provide more costly apparatus on the switchboard, and where to do that involves a rather nice balance. There are some [fol. 7987] cases where you can put in equipment of that type. But you could not prove in ripping out an old switchboard did not have it, and adding that thing, because the added expense would be too much. That is a matter that has to be carefully considered.

Take just for a couple of examples of some of the work that the Staff has done the question of contact metals in the switchboard. There are a great many contacts that are made and opened in the course of establishing a connection, contacts in relays and contacts in keys. Now, in the early days of the business in order to prevent those contacts from burning and introducing bad joints in the connection, platinum was used, and little platinum contacts were riveted on these springs in the relays and keys. Platinum is an expensive metal anyway, and as result of the War its price went up from something like 20 or $25.00 an ounce or even less to over $100.00 an ounce. So our experts in this line set about reducing the cost of these contacts. The first step they made was to spot weld platinum on these springs in-

stead of using a riveted contact. That reduced the amount of platinum that was used by about half. Then it was found possible in certain cases to use another metal, palladium, instead of platinum, which reduced the cost 50 per cent more where that could be used. That came along in 1913.

In 1917 it became possible to use in certain cases an alloy instead of palladium, and that reduced the cost 50 per cent further. That has amounted so far—all of those improve-
[fol. 7988] ments—to a saving of between two and three million dollars in the cost of contact metals alone in the Bell system.

Q. Who planned and developed the things which resulted in those savings?

A. That was done by the General Staff Engineers. The subject of the switchboard cords which are used to connect two subscribers lines together is rather an interesting line of development. The very earliest cords that were used made use of tinsel for the conductors, and the kind of tinsel was that which was available on the market, used for decorative purposes. That was a brass tinsel.

About 1895 a rolled copper tinsel replaced the brass, and tinsel was used up to about 1902 for the conductors in these cords. The life of these cords in service was comparatively short, due to the breaking of the conductors. In 1902 a steel conductor cord was developed and put in service. It was made up of steel ribbon conductors that were laid scirally around the core of the cord. That cord had a life in service of fully six times as long as the tinsel cords which it replaced. But it had certain disadvantages. The conductors were of higher resistance than the tinsel, which tended somewhat to adversely affect transmission.

Q. What do you mean by transmission?

A. Transmission is the transmitting of the telephone waves over the circuit, and such factors as resistance and capacity and inductance, which are electrical properties of the circuit, tend to diminish the power of the waves.

[fol. 7989] Q. With what result?

A. That the sound heard in the telephone is weak; and effect of capacity and inductance is also to distort the quality and make the voice less recognizable than it is if it is devoid of those conditions, or if they are kept at a minimum. I can go into that a little more fully when I finish up this subject of cords.

Q. Yes.

A. In 1913 an improved tinsel cord was again standardized and put into general use. As a result of long continued and very comprehensive tests, it was found possible to make a tinsel cord which would last as long as that steel cord and be free from these disadvantageous qualities that the steel cord possessed.

Since 1913 work has been continuously carr-ed on to still further improve the tinsel cords, and new cords have been devised now where the tinsel conductors are still more durable, and some special tips are provided so that the cords can be connected without the soldering which was done in the old cords. That makes a saving of only a few cents per cord, but when you stop to consider that there are between a million and a half and two million cords used every year in the Bell system, why, that saving alone will amount to between $75,000 and a $100,000 a year. I mention that as being a typical instance of one portion of the switchboard equipment that has been thoroughly and consistently worked over for a great many years, with improvements and economies to show for the result of the work.

Q. Mr. Rhodes, all this work that you are referring to [fol. 7990] and have been for the last day and a half is work done by the General Staff, is it not?

A. It is done by the General Staff, directed by the General Staff, and done in connection with engineers of the Western Electric Company.

Q. Done by whom?

A. By the General Staff of the American Company in connection with the engineers of the Western Electric Company, and I will describe that relationship in detail if you would like. I can do it right now.

Q. I don't want to have to ask you each time who did or was responsible for all of these things about which you speak. I was trying to cover it with a general question.

A. The guiding hand in this cord development, for instance, in laying down what are the operating conditions which must be met, and following through the work and conducting the tests before it is finally approved and recommended, that work is done by the General Staff.

Q. Yes.

A. Now, that question you asked me about transmission, if I could take just a few minutes to go into that, it might be

interesting, as showing what the problem of the transmission engineer is.

The principle of telephone transmission is this, that when one speaks in the air against the transmitter he sets up waves of compression and rarefaction in the air. The problem of the transmitter is to transmit those waves of condensation and rarefaction into electric waves of corresponding shape. And the problem of the receiving end of the circuit is to transform those electrical waves back into waves of condensation and rarefaction in the air, corresponding in shape to those which were directed against the [fol. 7991] transmitter.

The problem of the transmission engineer is to enable those waves to be transmitted over the circuit as nearly unchanged in shape as possible. Now, by means of apparatus it is possible to photograph those electrical waves in the circuit. And I have had photographs made of the waves corresponding to three words spoken over the telephone, and I have photographs showing those words, I took wer- Columbus, Cleveland and Cincinnati.

The means of showing those wave shapes is this, that by a very delicate apparatus, where there is a coil, which is capable of moving in proportion to the strength of the telephone current, in an apparatus of that kind, if a little mirror is fixed to the moving part of this apparatus, a beam of light can be reflected on to a photographis film, and the vertical motion of that beam of light corresponds to and is guided by the strength of the telephone current in the circuit. Then if a rapidly moving photographic film is passed so that that beam of light falls upon it, it is possible to show the shape of the waves. These three words were photographed in that way on a film that was traveling one hundred feet a second. I can put those in as an Exhibit if it would be interesting.

Mr. Burr: Let the photograph be marked Rhodes' Exhibit No. 52, and it is offered in evidence.

And thereupon the photograph above referred to was [fol. 7992] marked for the purposes of identification and was offered and admitted in evidence on behalf of the Ohio Bell Telephone Company, and is herewith submitted, marked Rhodes' Exhibit No. 52, and made a part hereof.

Mr. Dotson: The only objection I have to that is that you did not incluſe the name Toledo.

The Witness: Mr. Dotson, I can show you some portions of the names of these other cities, because I have similar photographs showing the vowels O and E.

Mr. Dotson: You are getting in the neighborhood anyway.

The Witness: So I have a part of Toledo in. These were taken on a film that was moving about ten feet a second.

Mr. Dotson: Does the quality of the voice of the speaker have any effect upon the disclosure of this film?

The Witness: It certainly does, yes, sir. I can perhaps explain that a little more fully. The louder the voice of the speaker the greater if the amplitude, that is, its height above and below the central axis. If one speaks in a very loud tone of voice, the wave goes up and down. Now, the pitch of the speaker's voice is represented by the number of complete waves that occur in a given period of time, and in a second. A low pitched voice may run down to three or four hundred oscillations a second, and a high pitched voice will have some tones in it that run above three thousand a second. Now, you can have two waves [fol. 7993] that have exactly the same height, corresponding to the loudness, and exactly the same pitch, corresponding to the number of oscillations that occur in a given time, yet you are able to recognize the voice of one speaker from another. That is due to the intermediate shape of the waves.

Mr. Dotson: I notice here in the word "Cincinnati" that the reproduction of the wave is different in the two syllables, or in the syllable "Cin," which is spoken twice.

The Witness: Yes, you see from that the speaker lingered a little longer on the first syllable than he did on the second, and that accounts for the greater length.

Mr. Dotson: It was spoken a little differently.

The Witness: It was spoken a little differently, yes, sir.

Q. You referred a moment ago to a photograph showing the fluctuations in the electric current when the vowels O and E are spoken into the telephone transmitter. Is this photograph which I show you the one to which you referred?

A. Yes, sir.

Mr. Burr: It may be marked for identification Rhodes Exhibit 5-3, and we offer it in evidence.

And thereupon the photograph above referred to was marked for the purposes of identification and was offered and admitted in evidence on behalf of the Ohio Bell Telephone Company, and is herewith submitted, marked Rhodes' Exhibit No. 53, and made a part hereof.

[fol. 7994] Q. Now, you were referring to the difficulties of the transmission engineer as illustrated by these photographs, but I do not think you had quite finished your reference to the subject.

A. Well, to close that up and tie it up with these Exhibits means simply this, that to the extent that apparatus is introduced in the circuit, unless the apparatus is properly designed and properly used, it tends to distort the shape of these waves from the transmitting end to the receiving end of the circuit. And the aim of the transmission engineer is to use apparatus so designed by the development engineers and so arranged and used and maintained in the plant of the associated company, that these wave shapes will be transmitted as nearly unimpaired as possible, of course, it is impossible to transmit them without the amplitude of the wave being very greatly decreased when long distance transmission is concerned, and there the waves have to be re-energized. But the aim is to transmit the wave shapes as nearly unimpaired as possible.

Q. Will you take up next, if you please, the subject of sub-station apparatus and trace its development?

A. By that we mean the apparatus that is used at the subscriber's station without including in that the transmitters, receivers, and induction coils, which I will describe separately. That is, the term is applied to the desk sets and ringers and wall sets, and the apparatus used in association with them. There the staff has brought about the development of moisture proof desk stand cords, cords that [fol. 7995] can be soaked in water for several hours without causing the conductors to be crossed. Now, that is a benefit to the associated companies, because with cords that are easily short-circuited by water there is trouble caused by leaning wet umbrellas against cords in wet weather or by having the cords wet in washing floors or leaving them near open windows when there is a rain. And by increasing the moisture proof qualities of those cords maintenance troubles have been appreciably reduced. There has also been important work done in improving the finish of desk

stands, so that they will wear a good deal longer before presenting a bad appearance and having to be brought in to be refinished. I think that is enough to show in a general way the character of work done on that subject.

Q. Have you any handbooks on the subject?

A. Yes.

Mr. Dotson: Do you know what kind of cords are used by independent companies? Are the same kinds of cords used as by the Bell?

The Witness: I am not familiar with independent practice in that respect.

By Mr. Burr:

Q. The cord, though, that the Bell Company uses, or the associated companies use, is the cord developed by the General Staff?

A. Yes, sir.

Q. Have you handbook 3851 of substation apparatus?

A. Yes, sir.

Mr. Burr: It may be marked for identification Rhodes Exhibit No. 54.

[fol. 7996] And thereupon the handbook referred to was marked for the purposes of identification as Rhodes' Exhibit No. 54.

Mr. Dotson: Just one more question with reference to cord. Do you know what the policy of the company is with reference to the use of cords in case of unification that belonged to instruments of the Ohio State Telephone Company?

The Witness: No, sir, I do not know that.

By Mr. Burr:

Q. Have you handbook No. 3853 on sub-station writing?

A. No.

Q. Well, have you No. 3855 on the adjustment of substation apparatus?

A. Yes, sir.

Mr. Burr: That may be marked for identification Rhodes' Exhibit No. 55.

And thereupon the handbook above referred to was marked for the purposes of identification as Rhodes Exhibit No. 55.

Q. Have you No. 3859 on sub-station wiring plans?
A. Yes, sir.

Mr. Burr: It may be marked for identification Rhodes Exhibit No. 56.

And thereupon the handbook above referred to was marked for the purposes of identification as Rhodes' Exhibit No. 56.

[fol. 7997] Q. Have you one on the subject of machine switching sub-stations?
A. Yes, sir.

Mr. Burr: Mark that Rhodes Exhibit No. 57.

And thereupon the handbook above referred to was marked for the purposes of identification as Rhodes' Exhibit No. 57.

Mr. Burr: We offer Exhibits 52 to 57 inclusive in evidence.

And thereupon the handbooks above offered were admitted in evidence on behalf of the Ohio Bell Telephone Company and are herewith submitted, marked respectively Rhodes' Exhibits Numbers 52, 53, 54, 55, 56 and 57, and made a part hereof.

Q. What, if you know, has been the work of the General Staff in connection with phantom circuits and what has resulted from that work if you know?

A. The phantom circuit is a development that applies particularly to the toll plant. Perhaps the simplest explanation that can be given of a phantom circuit is this. An ordinary physical circuit consists of two wires placed on adjacent pins on a crossarm. With those two wires placed on pins one and two on the crossarm, a conversation can be held between two subscribers A and B at each end of the circuit. Now, right alongside of that circuit you can have a second circuit of two wires on pins three and four on [fol. 7998] the cross arms and subscribers C and D can talk with each other over that circuit. Now, by connecting those two circuits together with proper apparatus and in

the proper manner, it is possible to hold a third conversation over those two pairs of wires, while the conversation previously referred to are going on, between two more subscribers, E and F, without interdering with the conversation over either of those side circuits or without the phantom conversation being interfered with by the conversation on those circuits. That is, from four wires a third circuit can be made, so that three simultaneous conversations can be carried on over four wires.

Now, the phantom circuit was first proposed about 1884. It was proposed simultaneously by an engineer in Europe and by General Carty, who is now the head of our Department of Development and Research, in this country.

Q. Was he then with the American Company?

A. No, he was not.

Q. When was that?

A. 1884. Now, for about twenty years there was very little practical use made of the phantom circuit. It was scarcely more than an interesting scientific curiosity. In attempting to apply the principle, there were a great many unforeseen difficulties. A very delicate and exact balance of the circuits and apparatus was required.

Q. What do you mean by that, the balance required?

A. It means that two windings or coils had to have exactly the same qualities of resistance, inductance and [fol. 7999] capacity and the circuits for each unit of length had to very closely correspond in their resistance, capacity, inductance and leakage. Otherwise there would be unbalancing, which would cause overhearing between the side circuits, as they are called and the phantom. It was not until about 1904 that electrical knowledge had advanced to the point where it was possible to construct this apparatus. There had been isolated cases of phantom circuits operated both in the Bell field and in the independent field, but they were not commercially satisfactory. About 1904 balanced coils suitable for this purpose were developed by the Bell engineers, and information was given to the associated companies as to the best method of transposing phantom and side circuits in relation to each other to avoid interference. From that time on the transposing of these circuits has been developed and improved, from time to time by the work of the General Staff, and new and improved phantom transposition plans have been placed at the dis-

posal of the operating companies. In the Bell system today, if phantom circuits were not available, additional copper circuits would have to be strung to carry the business that is now being carried over the phantom circuits, and the plant of the Bell system would cost in the neighborhood of eighty million dollars more than it has cost today if the additional copper circuits were required instead of the phantom circuits.

Mr. Dotson: That cost you speak of would also pertain to maintenance cost as well? Would there be a saving in [fol. 8000] maintenance cost?

A. In a way there would be because there would be in that other case more miles of circuit to be maintained.

Q. What purpose is served by the coils referred to in your answer previously made? You spoke about the adjustment of the circuits and mentioned coils in that connection?

A. They enable the current from the phantom circuit to divide itself equally over the two wires of one pair used side by side as a conductor, and the two wires of the other pair used side by side. Without that balance the phantom conversation would cause disturbance in the conversation on the side circuits.

Mr. Dotson: A phantom circuit apparatus is being used by all telephone companies independent as well as Bell?

The Witness: Yes, sir.

Mr. Dotson: What is the system or method of phantom circuits used by the independent companies? The same as the Bell?

The Witness: In a great many cases they have reproduced the coils that were developed in the Bell system, but I think that raises a point which is applicable to a great deal of the work that is done by the Staff, that after it is done somebody can come along and copy it. But I do not think that reduces the value of that service to the Bell associated companies of having it done in the first instance, because somebody else can come along and do it afterwards. [fol. 8001]

Mr. Dotson: You want to be understood then as saying that the Bell developed it commercially first of all?

The Witness: Yes, sir. Just a minute before I go on. I do not want to mislead Mr. Dotson in any way as to that question of developing it commercially. In this sense, before

these coils were available, there were phantom circuits that were used both by the Bell and the independents for commercial service in the sense that messages that were paid for were handled over those circuits, but they were not reliable and they were not satisfactory from the standpoint of good transmission. It could not be counted on to operate properly under varying conditions. They were not constant and reliable, and what I meant was that this commercial development was made by the Bell engineers and these balances were worked out and the phantom circuits became reliable and dependable things in use.

Mr. Dotson: Would you say that the independent companies developed a phantom circuit that was practical in their use at or about the same time that the Bell did, or was the Bell's invention in advance of the other by any period of time?

The Witness: Well, in so far as I remember, the phantom circuit application started and began to grow rapidly about the period around 1905, and at that time the first growth occurred in the Bell system and after that the independent growth came.

[fol. 8002] Mr. Dotson: Was this a patented process?

The Witness: No, sir.

Q. It could not be, could it?

A. No. In fact the original patents back in 1884 were never litigated.

Mr. Dotson: There was a patent issued?

The Witness: There was a patent issued to an Englishman named Jacobs and to Mr. Carty in this country practically simultaneously, and those patents were never litigated.

Mr. Dotson: You spoke awhile ago about the development of process or method by which you dispensed with the battery at the local station and furnished the energy from the central station. Was that a patented invention?

The Witness: Yes, sir.

Mr. Dotson: That was patented?

The Witness: Yes, sir.

Mr. Dotson: By the Bell Company?

The Witness: Yes, sir.

Mr. Dotson: Is that one of the patents listed in the Exhibit introduced here?

The Witness: No, because those patents have expired before this.

Mr. Dotson: Then the same method of furnishing the necessary energy in other telephone systems than the Bell system is also used.

The Witness: Well, if I get your question, there were after that time switchboards developed by independent manufacturers who sought to attain this same thing by [fol. 8003] dividing the cords, with a battery on one side and a battery on the other side, to accomplish the centralizing of the battery without the use of the cord circuits from the common battery. There were means devised for accomplishing it in a different manner.

By Mr. Burr:

Q. What is quadded cable, Mr. Rhodes, and what do you know of its development?

A. Perhaps the best approach to that would be through this phantom circuit matter which I have just discussed. For a considerable time after phantom circuits became available in the open wire plant, it was not possible to put phantom circuits in cables. That is, a line coming into a city from the open country consisting of wires on cross-arms on poles would necessarily some place within the city be carried on to the central office in cable. Now, a group of two physical circuits carrying the phantom, when it came to the cable, had to have the phantom circuit taken off on to a third pair of wires in the cable, so that where three conversations could be carried on over two circuits on the pole line, three circuits of cable were required in the cable. Naturally the obvious thing to do was to carry this phantom circuit on into the cable in a phantom group of four wires.

About 1908 the staff engineers undertook to do that, but no one knew how. The cable that resulted from the first attempts to carry the phantom principle into cable gave so great interference between the circuits as to prevent the use of such cable on a commercial scale. Our engineers [fol. 8004] attacked that problem from two points of view. One was to attempt to produce a cable having in its circuits a high degree of symmetry and balance that was required to enable the phantom circuit to be operated. The other thing to do was to determine whether cables in sufficient balance when they left the factory, could be connected up when they were installed, length to length, in a way so that

the unbalances of one length could be utilized by proper connection in the succeeding length. Now, we produced cable that could be used in that way. But still it left something to be desired, because where you got the necessary balance by compensating for an over amount or excess of one property in one length by another amount of it in the next length you produced a situation where if you had to replace a length of that cable due to the sheath going bad or water getting in, then this balance that had been worked out consecutively was lost. It required a great deal of work to determine how to twist up the two pairs, each of which was twisted individually, to twist them together so as to form a phantom group or quad of four wires.

I think it is sufficient to say that by working for a period of about four years and studying every part of the manufacturing process, it was finally possible to produce cable which had only about a quarter of the unbalance that the cables had when this problem was first attacked. In other words, they were made satisfactory for the purpose, and enough of that quadded cable has already been installed [fol. 8005] in the Bell system to show a saving of about $10,000,000 over what would have been the cost if it was necessary to provide extra circuits to bring the phantom in. That is, what this quadding principle does is to increase the circuit capacity of the quadded cables by fifty per cent.

Q. The benefits from that discovery are just beginning to be felt, are they not?

A. Well, there have been ten million dollars worth of it and it is added to every year, because the associated companies are putting in each year more and more of the quadded cable as they need it.

Mr. Dotson: Does that result in a saving of maintenance cost, traffic cost, and so forth in the operation of they system?

The Witness: It results in a saving in a maintenance cost in that you have fewer cables. The principal saving is in plant cost. That is, you have got a lower plant investment for a given number of circuits.

Mr. Dotson: Have you a model of the quadded cable?

The Witness: Yes, I have a section of the cable which contains quads of both sixteen gauge conductors, which are used on toll circuits in cable to a considerable extent and also quads of number 19 gauge cable. The proper relation

of these wires to each other to preserve the balance is securing by wrapping them with little cords, and those show in this sample of the cable. It does not look very much different in its lay-up from an ordinary cable, but if you examine it closely you can see the wires are laid in groups [fol. 8006] of four. And I have a photograph of that cable.

Mr. Burr: We offer the photograph in evidence, marked Rhode's Exhibit No. 58.

And thereupon the photograph above referred to was marked for the purposes of identification and was offered and admitted in evidence on behalf of the Ohio Bell Telephone Company, and is herewith submitted, marked Rhodes' Exhibit No. 58, and made a part hereof.

Mr. Dotson: Is this quadded cable used in local service or just in the service that is extended from the open country as you spoke of into the city?

The Witness: It is a toll line proposition.

Mr. Dotson: It is all toll line.

The Witness: They may be used to some limited extent in rural lines, but generally speaking it is a toll line proposition.

Mr. Shuler: Rather than local?

The Witness: Yes.

Q. What is meant by a loaded circuit, Mr. Rhodes, and what, if anything has been done by the General Staff toward developing the art of loading telephone circuits?

A. Loading is a practical method for increasing the efficiency of telephone circuits by equipping them at periodic intervals with coils of specific design. Perhaps the best way of introducing the subject of loading is to say that cir- [fol. 8007] cuits which can advantageously be equipped with these coils will in the case of open wire circuits talk as well as would circuits without the loading having copper maybe twice as heavy. In the case of circuits in cables, to do the same thing without loading that is accomplished by means of loading, require circuits on the average weighing from seven to eight times as much, that is, a cable circuit with wire weighing twenty pounds to the mile, equipped with loading coils, will talk as well as a circuit of wire weighing from 140 to 160 pounds to the mile. So where loading can be applied it is a very evident source of real economy in the

plant. It is applicable to the longer interoffice trunks in exchanges, and it is also applicable to open wire lines.

Now, where loading does not work like a relay or repeater to bring in any new energy in the telephone current it does operate to minimize losses in the circuit. The idea of adding inductance, as these coils do, to a circuit was more or less of a vision of scientific men for a long time, and it was not known how to do it practically until two inventors practically simultaneously discovered that it was possible to lump this inductance at points in the case of cable circuits on the average perhaps a mile and a half apart, and another mile and a half along the circuit apply another coil, and by placing those coils about four to a wave length, it was possible to obtain the same results as would be obtained by spreading the inductance along the conductor, which was the impractical thing which had made it impossible to [fol. 8008] realize the saving before that time.

One of the men working on this was a man on our General Staff, Doctor Campbell. Another man was Doctor Michael Pupin, Professor of electro-mechanics in Columbia University. Doctor Pupin had a little bit the advantage over Doctor Campbell in the dates in the Patent Office, and the American Company purchased Doctor Pupin's patents.

Now, they announce the physical law which told how this inductance must be spaced. It was not possible to take those patents—this is characteristic of a good many patents—and proceed by following the directions in that patent and make loading coils that should be applied in telephone circuits. We had to put at once a group of our most highly trained men at work on the porposition of how to make coils that would realize the benefits of this invention. At first it looked as though there would be necessary electrical losses in these coils, so that only a small portion of the theoretical benefit of the invention could be utilized. For instance, there was not wire suitable to make the cores of these coils. The coils themselves we found it was possible to make most advantageously out of a core or ring of iron shaped like a doughnut. Then two copper windings were placed around this coil, each of which was inserted in one side of the circuit. Now, the best kind of wire to make those cores out of it in the beginning was not available. The quality of iron that was necessary could not be had. Our people who were working on this thing had to go into a wire [fol. 8009] factory and work with the wire manufacturers.

And the first wire that we got suitable for our use in those coils cost $36.00 a pound. It was finally brought down to about 60 cents a pound.

Q. How was that done?

A. By improvements and developing the process of drawing the wire, so that the drawing would not give it improper magnetic properties. Now, I have some samples of these loaded coils that will show what they look like.

Mr. Dotson: What is the date of the invention that was obtained on the loading coils? About what year?

The Witness: It was about 1900 or 1902. And I might add right there that those fundamental patents of Doctor Pupin have expired, but the art is covered by a large number of detailed patents covering the process of manufacturing coils, and improvements in the coils which have resulted from the development work in improving the invention. Now, ther- is a complete cable loading coil. All that you can see of it is this copper winding which goes around the core, and the two terminal wires whereby one half of this winding is connected into one side of the circuit and the other half into the other side of the circuit. Now, within this copper winding is a core of iron wires. You can see it in this little section I hold, surrounded by a tape to hold the core in place. But if I remove a little of that you can see these purple wires. Now, this particular core contains about 70,000 turns of wire, which is 4/1000 of an inch in [fol. 8010] diameter. That is, in that coil there is about ten miles of that wire. Now, in order to prevent electric-l losses in the core, it is necessary to prevent electrical currents from circulating within the core itself, and that is accomplished by coating each individual strand of the wire with a compound in the nature of shellac, which gives it this purple color, and it is sufficient to insulate each one of these turns from the other.

Now, I have here one of the same coils which has been sawed apart in order to show the way this wire looks in the core, and I have on this little spool a sample of the wire itself which shows how fine it is.

Q. About as thick as a horse hair?

A. Something on that order. Exactly that is 4/1000 of an inch thick.

Mr. Dotson: This is the latest circulating medium.

The Witness: That is not the latest form of that coil. I am coming to another one.

Mr. Dotson: Mr. Rhodes is this same invention used by independent companies?

The Witness: No, sir.

Mr. Dotson: That you are describing?

The Witness: Not so far as I know.

Mr. Dotson: Do they use any similar mechanism?

The Witness: Not as far as I know.

Mr. Dotson: Do you — what became of the Campbell invention?

The Witness: That application was abandoned, I think, [fol. 8011] in favor of the Pupin one, which antedated it in the office.

Mr. Burr: The figures showing the model of the cable loading coil and section, wire core type, may be marked Rhodes' Exhibit No. 59, the one showing wire core for cable loading coil and wire for core before insulation is added may be marked Rhodes' Exhibit No. 60, the one showing cable loading coil and section, iron dust core type, Rhodes' Exhibit 61, the one showing irondust core and one of the rings, Rhodes' Exhibit 62, and we offer Exhibits 59 to 62 inclusive in evidence.

And thereupon the photographs above referred to were marked for the purposes of identification and were offered and admitted in evidence on behalf of the Ohio Bell Telephone Company, and are herewith submitted, marked respectively Rhodes' Exhibits Numbers 59, 60, 61 and 62 and made a part hereof.

The Witness: Now, although this invention was made in the early part of the century, a number of years of very intensive work was required to bring it to a perfection, and by "Perfection" I do not mean its final stage, because it is characteristic of this as of a great deal of our work that there is progress to be made and is being made most of the time. At the time of the War the supply of loading coils to the associated companies was seriously threatened. This very fine wire that was used in the cores of these coils was [fol. 8012] made by drawing it through a hole in a diamond, and these diamond dies came from Germany. The supply was cut off. It was a very fortunate thing for the supply of these materials that we had already started work to improve and cheapen them. Now, the nature of that work

consisted in substituting for this wire core a core that was made up of rings.

I have here the core itself containing seven of these rings, and here I have some individual samples of the rings themselves. Now, those rings look on the surface as though they were made of ordinary iron, perhaps cast. As a matter of fact they are made out of compressed tiny particles. They seven rings in a core of this kind contain about thirty five billions of these little particles, that is, it would take 1400 of each particle placed side by side to make a line an inch long. Those are made out of a very pure iron, which is made by depositing the iron electrolitically and then grinding it up to a powder and then insulating it by an insulating compound and compressing it under enormous pressure into these rings. The result of that was to enable the supply of loading coils to be kept up and at the same time the cost of the coils to them was reduced. This process of making coils was covered by a Bell system patent which was issued in 1918. Now, in order to show that those rings are not made, as they appear to be, of solid iron, you gentlemen can take those if you want to and break them.

Q. Am I right then, Mr. Rhodes, in saying that with reference to Exhibit 62, by this process of pulverizing or pow- [fol. 8013] dering iron and subjecting it to the shellac insulating method, you have been able by that comparatively simple method to do away in one single coil with say ten miles of this finer drawn and insulated iron wire?

A. Yes. I might say in the entire plant of the Bell Company if the efficiency which has been attained by means of these loading coils had had to be attained by means of larger wires with the same transmission results that are obtained today, the plant would have cost approximately one hundred million dollars more than has been the case today. Now, there is a saving which is not very largely shown in the Long Lines plant except in some Long Lines cable, because in the open wires we are accomplishing the results by means of repeaters, which I will come to later. There is a very wide application of these coils in the trunk line plant in the larger cities, such as Cleveland, and they are used to some extent in the toll line plant of the Ohio Bell Company in the rest of the state.

Q. Can you tell the saving per coil with one made out of

these circular rings on the one hand and the continuous iron wire on the other?

A. It is my recollection it is somewhere in the vicinity of a couple of dollars of coil, but I am not perfectly certain as to that. I would not want to state it definitely offhand. It did make an appreciable reduction in the cost, and I can say right there that there is work going on now by which we hope to bring the cost of these coils still further down. [fol. 8014] Now, it is an interesting thing to see this effect. The art of applying loading to cables where toll lines are necessarily brought in to a city. Before this invention was made available, in order to secure proper transmission it was absolutely necessary to bring the toll lines down just as close to the central office as possible in open wire construction. It was only the development of the loading coil that made it possible to use cable in these lines. And I have got a picture showing what it would mean in New York City to bring these lines down pretty close to the central office. That is the kind of pole line we would have to have, and it shows the way the city streets would have looked if this invention had not been made available.

Mr. Burr: The photograph may be marked Rhodes' Exhibit No. 63, and is offered in evidence.

And thereupon the photograph above referred to was marked for the purposes of identification as Rhodes' Exhibit No. 3 and was offered and admitted in evidence on behalf of the Ohio Bell Telephone Company and is herewith submitted and made a part thereof.

The Witness: They were 90 foot poles and carried 330 wires. Now, I think it is not without interest in this connection to mention how one important invention works in with another. Long after loading had been developed it could not be applied to phantom circuits. You could load [fol. 8015] the side circuits of the phantom, but you could not load the phantom circuit itself. And in order to load phantom circuits, so that you could load three circuits out of a group of four wires, was another very difficult problem that required a continued effort of some of our most highly trained engineers before they could develop coils so that it was possible to load not only the phantom but the side circuits as well. There are, as I mentioned, a very considerable number—I should say over 50—live patents covering

improvements that have been made in the art of loading. They cover the details of the design and manufacture, various methods of enclosing the coils in protective covering, and such matters as the construction of this type of core and the development of the phantom loading coil.

Q. What has been the work of the General Staff in connection with the development of repeaters or amplifiers and what effect has that had on the telephone art?

A. The first successful telephone repeater was invented by a Bell engineer and tried out on a circuit in the vicinity of Boston in 1904. An improved form of that type of repeater was commercially operated in the latter part of the same year on a circuit between New York and Chicago.

Q. What is a repeater and what is its function?

A. A repeater is a device for picking up the attenuated telephone current when it becomes very weak, supplying it with new energy and sending it out with this increased strength over a section of the line, that this wave shall be [fol. 8016] unimpaired. And that process can be continued for a number of stages, so that by means of this amplification at intermediate points it has been possible as everyone knows to transmit satisfactory talks across the United States.

Q. Could it have been done without the invention of these repeaters?

A. We did talk on loaded circuits, as far as Denver, but the results would have been very unsatisfactory on the coast to coast circuits. The first repeater was of a mechanical type. It was apparatus where the essential working part of a receiver was connected to a transmitter so that the current coming in over the line and passing through this receiver mechanism, instead of sending out sound in the air, actuated the working parts of a transmitter and provided for the supply of new energy. The transmitter itself is to a certain extent an amplifier. *But* that I mean it gives out more electric energy on the line than voice energy it receives from the lips of the speaker. That energy is supplied by the battery or other current producing means that operate the transmitter. In these mechanical repeaters we found that the results were not wholly satisfactory, and where you went on through a series of these repeaters and quality of the sound became very appreciably impaired. That was due to the fact that this mechanism had mechan-

ical inertia and energy was absorbed in actuating this mass of material, even though it was made as light and delicate as possible. So that it was apparent that we would have to get away from that mechanism and get into the region of [fol. 8017] what are known as electrons. The vacuum tube had been devised by Doctor DeForest for wireless telegraph purposes, and although in the form in which he had it it was not suitable for a telephone repeater, it offereed the means of progress. So we obtained the rights to use that for telephone purposes and set to work some of our ablest scientists to develop it and perfect it and make it useful over our lines. There was an instance where we turned to the most recent development in science and found a solution.

We have done a great deal of work in perfecting these cacuum tubes for use in the telephone plant. Among other things we have increased their life from about a thousand hours, which they had at the beginning, to over 20,000 hours at the present time.

Now, the application of that repeater in improving telephone transmission is particularly interesting in this respect. There were a good many people seeking at that time to improve transmission, and their ideas were to employ special and very ingeni-us forms of transmitters at the substations and very powerful batteries. That meant that any station that was going to make these long talks would have to be equipped with this special and expensive arrangement, and the volume of the sound produced was so great that to avoid cross talk, it would have meant serious changes in switchboards and in cables. We concluded from studying the subject that that was not the best way to increase the range of transmission; but the way to increase it was to im- [fol. 8018] prove the line itself, and I think it is a very satisfactory solution, that the capability of talking to any portion of the United States from these cities in Ohio has been realized without requiring the Ohio Company to make any change in its sub-station or central office or line equipment. Repeaters are used to some extent by the Ohio Company for its down connections wholly within the State of Ohio.

I have one of the vacuum tubes, which constitutes the essential element in the repeater. It is interesting, as it is the same type of tube in a general way that is now used in radio sets. This development was made back in the year

1910, considerably before broadcasting became popular. This repeater bulb by itself is by no means the entire equipment necessary in operating repeaters. I have a picture of the repeater bulb and socket itself, and another picture showing a set of sic repeater units, in which in each set the two repeater bulbs appear in the upper lefthand portion of the panel.

Mr. Burr: The photograph showing the repeater bulb may be marked Rhodes' Exhibit 64, and that showing the repeater installation just referred to by the witness, Rhodes Exhibit 65, and they are offered in evidence.

And thereupon the photographs above referred to were marked for the purposes of identification and were offered and admitted in evidence on behalf of the Ohio Bell Telephone Company, and are herewith submitted, marked re-[fol. 8019] spectively Rhodes' Exhibits Numbers 64 and 65, and made a part hereof.

Q. Describe briefly, if you will, the development of carrier current telephony under the direction of the General Staff.

A. That is an improvement whereby it has become possible to carry on five simultaneous telephone conversations over a single circuit, four in addition to the one that is normally carried on. It is a different proposition from phantom. The carrier is accomplished by mixing each one of the telephone currents with a high frequency current. One would be mixed with a current of 10,000 frequency, another with 15, another with 25, another with 30. Those all go on simultaneously over the same wire, and there are means, somewhat like selective filters at the receiving end, whereby each one of those high frequency currents is separated into its own channel and then the high frequency or carrier current removed, and the original telephone conversation left on its own channel?

Mr. Shuler: Is that used in local service?

The Witness: No, it is used in toll. At the present time the terminal apparatus that is necessary to bring this about is relatively extensive, so that for distances of less than 300 to 350 miles, it is more economical to string another circuit than it is to operate this carrier system. But it is in the stage now that a great many of these improvements have been in in the past. That is, our problem now is to

[fol. 8020] seek to reduce the cost of this terminal apparatus, and we are engaged on work now in which we are hopeful of making a very substantial reduction in its cost, so that it may be applicable to circuits down to 50 or a hundred miles in length. That is the problem that confronts us now to extend the range of its application by cheapening the cost of the terminal apparatus.

Mr. Shuler: But none of that expenditure is for local telephones?

The Witness: Not on that portion of the work. We cover the whole field of telephone work, exchange plant and toll plant as well.

Q. Tell very briefly what the General Staff has done, and is now doing on the subject of radio telephone.

A. There our problem has been to be sure that we were at all times provided with such rights and such apparatus as would enable the associated companies to make such use of radio as may turn out to be desirable in their plants. The problem comes up of maintaining telephone communications with vessels at sea or vessels in the lakes, with the cities along the lakes or ocean shore.

By means of this repeater installation and development it became possible in 1915 to transmit speech by radio from Washington to Paris in France across the Atlantic and as far as Hawaii on the other hand in the Pacific Ocean. That was in 1915.

We have since been studying with a great deal of care [fol. 8021] the developments in radio, and it became possible a year ago last January to maintain a one way talk for two hours across the Atlantic from New York to London. The speakers in New York were distinctly heard because everything that they said was cabled back and checked up pretty well. In fact the head of our department in talking at one time cleared his throat, and the London papers the next day carried an item that he was the first man who had ever coughed across the Atlantic.

We do not know what the extent or limitations of radio may be. It does not look a- though there would be a possibility of an extensive field in the vast telephone traffic of the United States, where we are handling a daily average of about 35,000,000 calls. It looks as though its applica-

tion would be for uses where it is not physically possible or else extremely expensive to construct and maintain wire plants. But for communications from ship to shore or between cities and airplanes there is a field for it. The [fol. 8022] available wave lengths are so limited that it looks as though it would be the only thing to do to restrict its use to such fields as wire telephony cannot be practiced in. But we regard it our duty under this work we are taking up and pursuing to be able to advise the associated companies as to the use of such things.

Q. Have you assured to the associated companies the right to make use of such apparatus?

A. We have very extensive patents, so that the field will be kept open.

Mr. Dotson: The immediate possibilities of that would be only in long distance service.

The Witness: Such service as the company might wish to give to vessels in the lakes.

Mr. Dotson: I mean on land.

The Witness: Yes, it would not be an exchange service proposition, no, sir.

Q. What is contemplated by the term, "Fundamental plans" and what service does the General Staff render for the associated companies in regard to fundamental plans?

The Witness: Answering the first part of that question, a fundamental plan manifests itself when completed in a map showing what the general layout of the telephone plant in a city is expected to be at some definite time from 15 to 20 years in the future. It shows the number of central office districts that will be required to provide the most advantageously. It shows the expected boundaries of these central office districts, the anticipated best location for [fol. 8023] the central office in each district, to enable the service to be given with a minimum amount of cable plant, and the proper locations in streets and alleys and the most economical number of conduits, of ducts when underground construction is entered into, in order that the plant may constitute a comprehensive distributing system reaching every city block that is to be conserved by underground cable.

Q. You may proceed.

A. I had gotten as far as to explain what a fundamental plan covered in a general way. Now, that question of the office districts and the location of offices and the best location and number of ducts for subways are all very definite questions that confront the executives of a telephone company when plant extensions are required.

Q. You are speaking now of the associated company?

A. Of the associated companies, yes, sir. The fundamental plan is therefore a guide to the management of the associated companies when they have to provide any of these improvements and expensive elements of plant, and they utilize these plans to the end that these plant additions shall be of the proper sizes and at the proper locations in order to conserve the requirements of the city with the greatest degree of economy. Now, the necessity for a fundamental plan arises from the fact that the normal condition of a telephone system is one of continual growth. Usually the number of telephone stations and the amount of telephone traffic grows more rapidly than does the population. In building the telephone system in a city like any [fol. 8024] one of these important Ohio cities, it would be impractical and uneconomical to limit the construction exactly to the present day needs.

For example, if in order to serve a particular locality, the telephone company must now place underground conduit, it would be a mistake to provide only the exact number of ducts that are required at the present time, assuming that future growth is expected. It would be most uneconomical to install more than the number of ducts required. That is, I mean it would not be economical to put down one duct this year and another one next year and another one the year after, because money would obviously be wasted in re-excavating and repaving the streets. On the other hand, instead of adding one duct a year, it would not be an economical thing to put down enough ducts to last for the next 50 or a hundred years, even though you could estimate the future with anything like a reasonable degree of accuracy for that length of time. In that case the return on the capital and other fixed charges would more than offset the saving that would result from frequently digging up and re-surfacing the street. Now, somewhere between those two extremes is the most economical amount of ducts to place. And under average con-

ditions it works out that it is most economical to build conduits for about 15 to 20 years ahead.

Q. Who first discovered that and how?

A. Our General Staff engineers sometime ago, and they have since checked it up, have estimated for a given num-
[fol. 8025] ber of years ahead what the costs would be, and have found that there is a minimum for that period of time. Now, that all carries you back to the expected growth in the number of stations and in the amount of the traffic. One way to do would be when you are going to put down conduit to have your conduit foreman and somebody else go out and look up and down *and* street and say, "We ought to put down, I guess, about six or eight or ten ducts." The other way is to make a careful estimate of the probably growth of population and the probable use of the telephone, to determine in that way a careful estimate of the probable future business. And it works out that a method of that kind on the whole gives much more reliable results than a pla-n guest would give. Of course, if we could get a guaranteed grade A prophet anywhere, the telephone company would like to employ him on its staff. But in the absence of that. The next best thing for us to do is to make these careful studies, and a careful forecast is better than a rough guess.

Now, — we do is to make a commercial survey, which is a forecast of the future community, showing the probable amount, distribution and character of the future population, the business firms and telephone users. The first thing that is done is a telephone census of the existing users and what is termed a house count is made of the community. That is, it is found on the whole the use that is made of the telephone, the class of service that is chosen, bears on the whole a fairly close relation to the amount of rent
[fol. 8026] or the equivalent of rent that is paid for the houses in which the users live. Then the present users are classified into residence telephones, business telephones in the residence area, and telephones in the business district. For families they are divided into private residences, two-family houses, apartments and boarding houses. Then the same classification is followed in detail in the business sections. From all that information careful forecasts are made, combined with the estimates of the probable future population to give an indication of the probable future use of the telephone.

Now, each city required special study, as there are no uniform rules or formulas that can be substituted for judgment and experience in making these forecasts. Each city requires special study, as there are no uniform rules or formulas that can be substituted for judgment and experience in making these forecasts. Each city has its own reasons for its past growth and each will have its peculiar reasons governing its future growth.

Mr. Dotson: To what extent does the element of cost of service enter into the survey?

The Witness: It comes in as a very important factor and the best information possible as to the future cost of service is made by the commercial department people who have this in hand.

Mr. Shuler: How often have you made a survey in Cleveland?

The Witness: The last one that was made was in 1921.

[fol. 8027] Mr. Shuler: When was the one previous?

The Witness: I don't know that I have a record of that.

Mr. Shuler: How many have you made in ten years?

The Witness: It would be unusual if more than one were made. That is, they are made at a time when there are some major extension- contemplated. That is, we do not make them for the full fifteen or twenty year period and then let the thing run to the end of that time, but when it appears that conditions have changed enough so that another study is justified, that is made.

Mr. Dotson: Have you made a survey of Toledo?

The Witness: Yes, there was one made in 1920.

Q. Was that made with reference to unification?

The Witness: I can't say. I am not sufficiently familiar with the detail, but in most cases they have been so made. There was one study that was made for Springfield in the year 1905, and what we call the ultimate date for that study was in 1920. That is, in 1905 the prediction was made as to what the population would be in Springfield in 1920. In 1905 the prediction was that there would be 60,000 people in Springfield, and it is my impression that it has worked out fairly closely to that in the 1920 census.

Mr. Shuler: How many surveys have you made in Ohio in the last ten years?

The Witness: Akron, Cincinnati, Cleveland.

Mr. Shuler: Cincinnati is not your company.

[fol. 8028] The Witness: You asked me in the State of Ohio. Cleveland, 1921.

Mr. Burr: That company does pay the four and a half.

The Witness: 1922; Toledo, 1920, Youngstown, 1919. Those are the surveys in which the American Company has corporated in the field work with the local company. I cannot say how many the Ohio Bell itself and its predecessor have made with their own people.

Mr. Shuler: I mean the A. T. & T.

The Witness: These are the ones in which we have co-operated directly in sending men out here in the field, and with the excepting of Cincinnati, leaving that out, we had men out here a total of 3,352 days. Their expenses and board and all that were paid by the General Staff while they were on the work.

Mr. Shuler: That is in how many years?

The Witness: That covered studies in 1919, 1920, 1921 and 1922.

Mr. Burr: Five years.

The Witness: Three years.

Mr. Shuler: I am talking about the ten year period.

The Witness: I haven't it back of that.

Mr. Kinnison: Was there any charge for the services and expenses of those men that you sent out in the field?

The Witness: No, that is paid by the General Staff. Our people who are in this work are concentrating on the proposition of doing as much work as possible, of the funda-[fol. 8029] mental work involved in this, the principles involved, the growth of population and the best methods to be followed in making these plans—the associated companies have followed up with their forces in doing this work, so that they have an organization doing it, and our work is concentrated on the fundamental propositions involved. A number of circulars have been prepared and sent out. Here is one in February, 1923 on the subject of commercial surveys.

Mr. Shuler: Just to get the record straight, these surveys you speak about were not all made by the A. T. & T. General Staff, but they simply co-operated with the engineers of the local companies.

The Witness: Yes, sir.

Mr. Shuler: So that you do not give them all the information on surveys?

The Witness: We give them the information on the

methods, and in these that I spoke of we have cooperated in the field work. But in general the division of the responsibility is that the general basis methods are worked out by the central organization and the field work done by the associated companies, although in these cases they did call on us for cooperation and we furnished the cooperation in the field. Now, this circular shows the forms and methods that have been worked out as a result of experience, showing the most accurate and most economical methods for making these commercial surveys. There is a series of [fol. 8030] these. I only brought out this one which is entitled Commercial circular No. 39, commercial surveys and analysis of a multi-office or large single office community.

Mr. Burr: That may be marked Rhodes' Exhibit 66, and is offered in evidence.

And thereupon the handbook above referred to was marked for the purposes of identification and was offered and admitted in evidence on behalf of the Ohio Bell Telephone Company, and is herewith submitted, marked Rhodes' Exhibit No. 66, and made a part hereof.

Q. Are there other commercial circulars which have been issued from time to time by the General Staff?

A. Yes, sir. There is one recent one which I did not bring out which is a very careful estimate of the future population of the United States by sections for the year 1950, the mid-century, taking account of the best study that it has been possible to make of all such factors as immigration and the increasing tendency of Urban populations to grow faster than rural populations, and matters of that kind.

Q. What has been and is being done by the General Staff in the matter of the standardization of materials, apparatus and methods?

A, That is a very important function of our work and perhaps the best introduction that could be made to the subject of standardization is to just say a few words about what occurs in a telephone system where standardization is comparatively little advanced. Now, that happens to [fol. 8031] be the state of affairs in the French telephone system. It has been said that in France telephoning is little more than an adventure in a complex of silence and blasphemy. The condition in France is that the subscribers buy their telephone instruments from manufacturers. The

telephone administration, the Government administration, has approved about 150 types of telephone instruments made by about 25 different manufacturers, and all these manufacturers have done the best they could to get new types approved and to sell them to subscribers. Now, from time to time some of these manufacturers have discontinued making certain types of telephone instruments, some because it did not pay to make them any longer and some because they failed and went out of business.

That has put the subscribers in a very bad position, because they could not get parts for the replacement of those instruments. In France instruments are installed by Government employees. The subscriber, as I said, buys his instrument and the Government maintains it. It has been very difficult to familiarize the inspectors with 150 different types of instruments, and it is difficult to carry in stock the parts that are necessary for repairs. So when the subscriber has some difficulty with his instrument, he reports it to the telephone administration, and when they get around to it they send a man to the subscriber's premises to make an inspection. He often reports that the difficulty is not in the Government lines, but is in the subscriber's instru- [fol. 8032] ments, and perhaps they try to correct the fault. If they do not succeed they tell the subscriber he has a bad set, and he ought to take it up with the manufacturer that he bought it from. So he goes to the manufacturers and says, "That set you sold me such and such a time is a bad one. What are you going to do about it?" So the manufacturer sends somebody to look the set over, and he finds the difficulty is not in the set at all, but in the Government lines, and it is a common fact for that responsibility to be passed back and forth.

The result is, of course, loss of time to the subscriber, and inconvenience to all other subscribers who want to call him. With so many different types of instruments it has been found impossible to establish a different standard of transmission, and it often happens in connection with one subscriber, the service is good and perhaps with the next one it is very bad. On account of the difference in the range of the instruments it has not been possible to use the minimum amount of copper in the trunk lines, but the trunk lines have had to be made sufficiently expensive in order to handle the weak transmission from the poor stations.

Now, of course, the Bell system in the United States is

standardized, and that standardization is done through the General Staff organization. Unless that existed, to recommend standards, there would be a multiplicity of types for each of the thousands of pieces of apparatus that are used in the telephone system, and there would also be the same [fol. 8033] state of affairs in regard to methods of operating, which would result in a lack of efficiency and economy in many things.

One of the results of this standardization is that it makes the best available for all. It also reduces the cost of apparatus to the associated companies, because the same thing can be made in the larges quantities and most economically. As manufacturing proposition uniformity in output contributes economy in production. Standardization also reduces the cost of carrying stocks of materials and the cost of maintenance and repairs, because fewer parts have to be carried than if there were a multitude of different types of apparatus. It also reduces the cost of construction to new employees, because there are fewer things to get acquainted with. It reduces the cost of plant account, because there are fewer things to be kept track of.

It has another advantage, in that it renders available enormous stocks of supplies, material and labor in the event of emergencies. That is, if there is a wholesale destruction of a plant as the result of some calamity like a flood, it is possible to bring in materials from a distance which can be erected and fit in with the plant that is already there, and it is possible to bring in men from a distance, even from another company, who can erect that material, because they are using materials with which they are all familiar in their own territory.

Now, we do not have merely one standard and try to [fol. 8034] force the business arbitrarily into that particular mold. We do have as many standards as varying conditions require, and they are changed whenever it is to the advantage of the associated companies to do it, and we clearly recognize that there are frequently special conditions where no particular standard is the best thing to use, and there we very frequently on the request of the associated companies give them advice as to what is the best thing to do under those conditions.

I would like to stress particularly that point that our standards are dynamic and not static. We are dealing in this telephone business with a living organism, as continu-

ally growing thing, and we must endeavor at all times to keep our specifications and our methods and our apparatus under review, to see whether they stand the test that each day applies to them.

Now, a change in a specification or a standard does not mean a verbal change in that document that can be easily made by changing some words in it, but it does mean that everyone of those changes must be carefully considered, to see what the effect is going to be, not only on that piece of apparatus, but other apparatus that it has to work in connection with.

Very frequently our standards for materials have to be changed on account of changes in the prices of basic materials. Something like silk, for instance, which is used in various places in a telephone plant, may become relatively [fol. 8035] very expensive. We must immediately get busy and find what can be done to avoid its use or to make the best substitute for it. And that means that in order that the associated companies will not get into trouble from using something new, that tests must be conducted over a sufficient interval of time, accelerated and other tests, in order to determine that that particular new thing they are gonig to use is not going to be ultimately a source of trouble.

Mr. Shuler: Do you forget to mention the value to the A. T. & T. of standardization?

The Witness: You mean in the Long Lines plant?

Mr. Shuler: Yes.

The Witness: Oh yes, it is very valuable, too.

Mr. Shuler: It is very valuable to Western Electric, which A. T. & T. owns.

The Witness: No, I don't think so. I think the Western Electric Company would make more money if they were making 150 different things than one.

Q. And the Long Lines pay for the services under the license contract just the same as one of the associated companies?

A. Yes.

Mr. Dotson: Speaking about the Long Lines paying four and one half per cent, I have been wondering about the ownership of those lines. You mean the toll lines.

The Witness: I mean the lines that connect the territories of the different associated companies broadly, yes.

Mr. Dotson: Yes, who owns those lines?

[fol. 8036] The Witness: The American Telephone & Telegraph Company, Long Lines Division.

Mr. Dotson: In their own name or by some other name?

The Witness: No, in their own name. I think that they are owned generally by state sub-divisions of the A. T. & T. Company, but it is operated as one system.

By Mr. Burr:

Q. For example in Ohio is the Ohio Telephone & Telegraph Company, is it not?

A. I am not sure, but I think it probably is because in general there are state organizations, following state lines.

Mr. Kinnison: Separate corporations?

Mr. Shuler: Yes.

Q. Describe if you will please, the instrument services performed by the American Company for the Ohio Bell Telephone Company.

A. Another portion of this service under the license contract consists in furnishing the associated companies, such as the Ohio Bell Company, with all of the transmitters, the induction coils that go with those transmitters and the receivers that are used by the associated companies in giving service. It includes the instruments required for use at subscribers' stations, at operators' switchboard positions, for wire chiefs' desks and test men's use, also at private branch exchanges. Now, that includes replacing without cost all instruments that are accidentally destroyed or injured. It includes repairing these instruments when there is anything wrong with them. Whenever a general improvement in the type of instrument is made and a new type [fol. 8037] of instrument is brought out, the Ohio Company under the present arrangement is free to return the instruments of the older type, and without additional charge to obtain instruments of the new type. In other words, they are free to exchange instruments of one type for another whenever from their viewpoint it is desirable to do so. The services also provides for a surplus or working stock of instruments in the hands of the Ohio Company, to enable it to meet current demands. The Ohio Company also has the advantage of a further stock of instruments, which is maintained by the American Company to insure the continuity of supply of these instruments and to provide for extraordinary contingencies, that is, so that if there is an accident

to the factory where the instruments are made, that there will be no hold-up in the supply of the instruments. Now, that assures the Ohio Company always of an adequate supply of instruments, and with no temptation for the sake of economy to keep them in use longer than the best interests of the service will permit. It gives them an assurance that its instruments at all times will be a class suited to the conditions of use, and it carries with it the standardization of types of instruments which is essential to the best service.

Mr. Dodson: Who maintains the instruments in the way of repairs or any expense that enters into the keeping of the instrument fit while in use.

The Witness: What happens where an instrument is unfit, the Ohio Company returns that instrument to the Ameri-
[fol. 8038] can Company and gets a new instrument in its place. The American Company, if it is capable of being repaired, we will repair it, if it can be made as good ad a new instrument. Of course, the American Company does not provide a man to go out to the station where that instrument is and take it out and put in another. The Ohio Company does that and sends it back to the company and gets a new instrument in its place.

Mr. Dotson: That is one where it is not fit for repair.

The Witness: Well, if they need some parts, if the mouthpiece breaks or the shell of the receiver breaks, they are provided without additional charge with these parts. The American Company has also from the beginning assumed the obligation of developing the art of transmitters and receivers, so that they will be made continually more efficient and effective. The first instruments, of course, were very crude, and it was possible to talk just a few miles with them. There were various types of instruments that were used in the beginning, from this instrument I showed you yesterday, the first instrument of Professor Bell, down to the time that the Blake transmitter came in about 1878, and I have one of the old Blake transmitters.

Now, when that instrument took the place of the instruments that preceded it, it was a very great improvement. It gave clear transmission, not very strong transmission, but clear transmission. It was a difficult instrument to maintain in adjustment. Development work was done then on an instrument which employed granular carbon for the
[fol. 8039] working portion of the instrument. The Ameri-

can Company obtained the patent rights of an Englishman, Henry Hummings. He was an English clergyman who did some experimenting and found granular carbon as the essential instrument was a great improvement over carbon in solid blocks. After acquiring those rights it was found that the efficiency of the instrument fell off very rapidly. So the men on the General Staff who were concerned with this problem had a difficult development proposition to employ that granular carbon proposition in an effective instrument. There was one that was finally devised by a member of the General Staff, known as the solid back transmitter, and I have one of those early instruments.

Mr. Burr: The photograph of it, if you have one, may be marked Rhodes' Exhibit No. 67.

The Witness: I have one.

And thereupon the photograph above referred to was marked for the purposes of identification as Rhodes' Exhibit No. 67.

The Witness: That was known as the solid back wall set, or the Number 239 instrument and the induction coil was contained in this swelling in the base of the instrument.

Mr. Burr: It may be marked Rhodes' Exhibit No. 68.

[fol. 8040] And thereupon the photograph above referred to was marked for the purposes of identification as Rhodes' Exhibit No. 68.

The Witness: Now, I will only show some of the principal types of instrument which came along and succeeded this. The next instruments which came along from 1900 to 1904 were adopted for use on common battery lines. There was first the 242 bracket instrument, this instrument that had the cord on the outside of the arm.

Then in order to reduce the maintenance troubles of the associated companies, another type, 250, was brought out, which had the cord concealed within the arm.

Mr. Burr: The photograph of No. 242 may be marked Rhodes Exhibit No. 69, and of 250 Rhodes Exhibit No. 70.

And thereupon the photographs above referred to were marked for the purposes of identification respectively as Rhodes' Exhibits Numbers 242 and 250.

[fol. 8041] The Witness: Now when the desk stand at the subscriber's premises began to become popular, there was a type of instrument, consisting of the transmitter head alone, which was known as the 229 instrument, which began to go into service about 1902, and as a matter of possible interest I brought along a cross section of that instrument, where it is sawed in halves and put in a glass case so that its construction is made clear, and from that it is possible to explain the operation of the instrument if anybody is interested in it. I have an enlarged picture of that cross section, which shows the operative parts of the instrument.

Mr. Burr: The photograph of transmitter Number 229 may be marked Rhodes' Exhibit Number 71, and that of the cross section of transmitter Number 229 may be marked Rhodes' Exhibit Number 72.

And thereupon the photographs above referred to were marked for the purposes of identification respectively as Rhodes' Exhibits Numbers 71 and 72.

The Witness: Now along about 1913 an improved form of this transmitter came along, which talked better than the one that preceded it. This was Number 329. As far as the external adherence goes it is not very different from the 229.

Q. Have you a photograph of it?

A. Yes.

[fol. 8042] Mr. Burr: It may be marked Rhodes' Exhibit Number 73.

And thereupon the photograph above referred to was marked for the purposes of identification as Rhodes' Exhibit Number 73.

The Witness: A still further improvement in the transmitter, which made the instrument talk appreciably better than the preceding one, came in the 323 instrument, which became available in 1918. This is the 323 instrument.

Mr. Burr: The photograph of it may be marked Rhodes' Exhibit Number 74.

And thereupon the photograph above referred to was marked for the purposes of identification as Rhodes' Exhibit Number 74.

The Witness: And in 1920 came 337 type, which is an instrument of especially high efficiency and is useful in t

plants of the associated companies on particularly long subscribers' lines. Now right in that connection——

Mr. Burr: Just a moment. The photograph of it may be marked Rhodes' Exhibit Number 75.

And thereupon the photograph above referred to was marked for the purposes of identification as Rhodes' Exhibit Number 75.

[fol. 8043] The Witness: Now I would like to at this point, point out that these improvements in the efficiency of the transmitter have made it possible for the associated companies to use an increased amount of economibal small gauge cable in their plant, and still give the subscribers a satisfactory degree of transmission, so that the improved instruments have resulted in real economies in the plant construction costs.

Q. What organization worked out the improvement in these transmitters?

A. The General Staff Engineers of the American Company.

Mr. Dotson: Were all these improvements covered by patents?

The Witness: Many of them are, these instruments of later dates; the essential features, are covered by patent in these later instruments.

Q. Are those transmitters referred to by you in your recent answers the only ones that have been developed from time to time by the General Staff, or are there others?

A. No, there are others. There have been not less than 66 different types of transmitters that have been standard previous to the present standards. Many of them have special uses, but they have been standard and are now obsolete; and I have a picture which shows some of these instruments which have been standard at various times in the past.

[fol. 8044] Mr. Burr: It may be marked Rhodes' Exhibit Number 76.

And thereupon the photograph above referred to was marked for the purposes of identification as Rhodes' Exhibit Number 76.

The Witness: Now the development of these instruments has carried with it a vast amount of work on the carbon

that is used in the button of the instrument, both in the granular carbon itself and the carbon that is used in the front and back electrodes, two little disks which you can see in the section of the instrument.

Q. That is in Exhibit 72?

A. I am not sure as to that.

Q. In the cross section?

A. Yes, in the cross section. The method of treating the carbon to secure the best results and the design and dimension of every instrument, has been the subject of experimental work. There is no way that it can be worked out in advance scientifically. These improvements have got to be made by cut and try methods, and the process of that experimental development has naturally to be a slow one, because various combinations have to be tried, and comparatively small changes in the dimensions and proportions of the parts will have a very profound effect on the character of the talk given by the instruments. Now in addition to these instruments there are special types which are more expensive, that are provided for operators, and the associated companies get those on the same ar- [fol. 8045] rangement that they get the others under the license contract. With these instruments is furnished an induction coil, which is made with an iron core and two copper windings, and it connects the transmitter and receiver together in the most effective manner. And I have here one of the Number 46 type of coils, which is the latest type used, and I also have a picture of this Number 46 coil.

Mr. Burr: The picture may be marked Rhodes' Exhibit 77.

And thereupon the photograph above referred to was marked for the purposes of identification as Rhodes' Exhibit Number 77.

Mr. Burr: And at this time we offer in evidence Rhodes' Exhibits 67 to 77 inclusive.

And thereupon the photographs above offered were admitted in evidence on behalf of the Ohio Bell Telephone Company, and are herewith submitted, marked respectively Rhodes' Exhibits Numbers 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, and 77, and made a part hereof.

The Witness: Now the same line of development or a development of the same kind as that which has occurred in transmitters has occurred in the case of the telephone receivers. They type of receiver that was in *the* use when I came into the business was the Number 101 type, the [fol. 8046] old single pole hand telephone. By single pole I mean this. The instrument contains a long bar magnet, and there is a pole piece on the end containing the wire itself in the telephone circuit. That magnet attracts the little iron diaphragm and holds it in place, and the re-enforcement or diminshing of the magnetism of that magnet by the electro-magnetism of that electric current passing through that coil is what produces the sound in the instrument.

Now our engineers began at a very early date experimenting with bi-polar receivers. They began back as far as 1888 and 1889. It was as late as 1900 when a thoroughly satisfactory form of bi-polar receiver was produced. The first instrument was an instrument with a single piece shell, and you will notice here that the bar magnet is bent in a U shape, and there are two pole pieces, each one with a coil, and these are connected together. It makes a more powerful and efficient receiver. Long after that, about 1904 came a later type of bi-polar receiver differing from the first in that the shell was made in two pieces in order to reduce breakage of the shell itself. Then in that year 1911 or '12 came the 144 type of receiver, a unit type in which the cup and the magnet and the pole pieces are electrically welded. The trouble that occurred with some of these early instruments was due to dust getting into them and affecting their operation. This is very satisfactory in that respect, and this is the type of instrument which is and has for a great many years been the type that [fol. 8047] been put out. Now the same type of development has gone on with respect to types of receivers that have been used and are now obsolete. I have another diagram which shows 48 types of receivers that have been standard at one time or another in the past.

Q. Is that all of them?

A. Not all of them. No, there were some others. I think there were about 56 in all. This shows 48. I don't know whether you can see from there this instrument, which has

a large cap to which the head of the instrument is connected. That was the first type of operator's telephone——

Mr. Shuler: Do you mean to say that all those were developed by the A. T. and T. Staff?

The Witness: All in this photograph were.

Q. Have you a photograph of that Number 101 receiver?
A. Yes, sir.

Mr. Burr: It may be marked for identification Rhodes' Exhibit Number 78.

And thereupon the photograph above referred to was marked for the purposes of identification as Rhodes' Exhibit Number 78.

Q. Have you one showing the Number 122 receiver?
A. I have, showing the two forms on one picture. I also omitted to mention that I have a cross section of this 122 instrument and a picture of that, which shows its structure in a pretty clear way.

[fol. 8048] Mr. Burr: Number 122 may be marked for identification Rhodes' Exhibit 79.

And thereupon the photograph above referred to was marked for the purposes Of identification as Rhodes' Exhibit Number 79.

The Witness: The next one might be a cross section of that.

Mr. Burr: The cross section of Number 122 receiver is marked Rhodes' Exhibit Number 80.

And thereupon the photograph above referred to was marked for the purposes of identification as Rhodes' Exhibit Number 80.

Mr. Burr: The Number 144 receiver is marked Rhodes' Exhibit Number 81.

And thereupon the photograph above referred to was marked for the purposes of identification as Rhodes' Exhibit Number 81.

The Witness: Now in connection with that subject——

Q. Just a moment?
A. Yes.

Mr. Burr: The photograph showing types of receivers heretofore standard but now obsolete may be marked for identification Rhodes' Exhibit 82.

And thereupon the photograph above referred to was [fol. 8049] marked for the purposes of identification as Rhodes' Exhibit Number 82.

Mr. Burr: And we will offer Rhodes' Exhibits Numbers 78 to 82 inclusive in evidence.

And thereupon the photographs above offered were admitted in evidence on behalf of the Ohio Bell Telephone Company and are herewith submitted, marked respectively Rhodes' Exhibits Numbers 78, 79, 80, 81 and 82, and made a part hereof.

The Witness: I was asked if all those instruments shown on those sheets were developed by Bell engineers. In that connection, I would like to say that it is a fact that instruments have been developed outside of the Bell System, and in many respects they have been based on the Bell instruments on that particular period. Some of them have been very good instruments. I do not want in any way to appear to knock the independent instruments. At their best, when they were in good adjustment, they approached very closely the quality of our instruments. Our instruments however are designed with especial reference to the circuits in which they are used in the Bell System, and for that reason they are generally the most satisfactory instruments *than* that can be used with our system.

Mr. Dotson: You said devised by Bell interests. Is that intentionally said?—Bell rather than A. T. and T.

The Witness: I had in mind the engineers of the General [fol. 8050] Staff, working in connection with the engineers of the Western Electric Company, as all our work is carried on.

Q. What is done in the way of subjecting these instruments to life tests?

A. An important thing is to know that these instruments which are going out, literally millions of them a year, are not allowed to fall below a certain standard of efficiency. For that reason samples are regularly selected from every lot of instruments produced. They are mounted in special frames, with a receiver attached directly over the mouth

piece of the transmitter. That receive- is actuated very powerfully by a phonograph, a talking machine, so that in a period of a few weeks of continuous loud talk into them, they are subjected to a service equivalent to what they would receive in many years of actual practice, and after being subjected to that heavy load, they are tested to be sure that their efficiency has not fallen below the limit that we place that those instruments should hold up to. There are a number of details connected with that test. There is a heavy weight at intervals of about five minutes released and comes down with a heavy bang on the frame that holds these transmitters. That is intended to give them experience similar to what takes place if a receiver is replaced very violently on the desk stand or the desk stand falls over and strikes the floor. The purpose is that the instruments shall be up always to the desire- high standard.

[fol. 8051] Q. Have you made any investigation of the cost to the Ohio Bell Telephone Company in case it should provide its own instruments?

A. I have made an estimate of what it would cost the Ohio Bell Company in the State of Ohio to provide its own instruments, that is to obtain instrument service equivalent to that which it now receives from the American Company, in case it did not receive its instruments under the present license contract arrangement.

Mr. Shuler: Have you copies of that?

The Witness: Yes, sir.

Q. From your investigation of the subject, what is your opinion as to what the cost to the Ohio Bell Company would be.

Mr. Kinnison: We object to that. I do not think his opinion as to cost is in this case.

Mr. Burr: I will ask him what his judgment will be.

Mr. Shuler: I think he may show it as a matter of tabulation. He says he has the basis of it.

The Witness: I have used this tabulation as a guide to my judgment.

Mr. Burr: Go ahead.

Commissioner Poor: Is he taking into consideration here something besides the actual cost of the instrument?

The Witness: No, this is merely the instrument service

alone. It is my opinion that the annual cost per station to the Bell Company in Ohio would be slightly under one dollar per year per station to provide itself with instru- [fol. 8052] ments if it — not obtain them by the present method, and the detail of the figures on which I base my judgment are contained in this single sheet.

Mr. Burr: It may be marked for identification Rhodes' Exhibits Number 83 and is offered in evidence.

Mr. Dotson: Is that estimate based upon cost of production by the Western Electric Company or on the basis of buying them in the open market in large quantities?

The Witness: It is based on buying in the open market in large quantities.

And thereupon the paper writing above referred to was marked for the purposes of identification and was offered and admitted in evidence on behalf of the Ohio Bell Telephone Company, and is herewith submitted, marked Rhodes' Exhibit Number 83, and made a part hereof.

Q. Explain your computation in detail if you please?

A. This Exhibit refers to what is known as a set of instruments. One set of instruments includes a transmitter, induction coil and receiver. The present open market price of the type of instrument now used is $4.90 per set. I have assumed in this computation a first cost figure for the set of instruments of $4.50. I have taken that to be conservatively low, on the face side, with the thought that if the Ohio Company were going to replace instruments at four or five hundred stations, a lower figure than the present [fol. 8053] market price might be obtained.

Mr. Kinnison: That price you have given is list price of the Western Electric Company?

The Witness: List price of $4.90. I can give you the detail of it if you would like to have it.

Mr. Kinnison: I do not care anything about it.

The Witness: Now that is the figure which appears on line one of my exhibit. I have next computed the annual cost per set of instruments. On line three I have used an eight per cent return on the investment of $4.50, which amounts to thirty-six cents. I have used this figure of eight per cent, because in the public utility business, with the risk involved in that kind of business, a return of eight per cent appears to be about the minimum rate of return for

which money can be attracted into the business, and it is a figure which has often been allowed by commissions. In line four I have used a seven per cent credit for the account reserve for accrued depreciation, which amounts to thirty-one and one half cents. I have based that figure of seven per cent on my general knowledge and experience in connection with the business, and that has led me to the conclusion that not less than seven per cent a year should be set aside for the purpose of providing a reserve of this kind due to all causes, including the effect of changes in the art. That is not limited alone by the physical life of these instruments if they were allowed to live out their life, but [fol. 8054] by the fact that as new and improved instruments have come along, they have tended to sweep out of use the type of instruments that preceded them.

In line 5 I have used for repairs a figure of nine cents per set of instruments per year. In arriving at this figure, I have taken into account the costs to the American Company making these repairs and I have adopted this figure because it is my belief that the Ohio Company could not make these repairs for a less figure than that if they undertook to do it.

In line six I have included an item of one per cent for cost of administration. If the Ohio Company did not obtain its instruments under the present arrangements, it would have to undertake the work of purchasing instruments, of inspecting them as they were received, of keeping track of their requirements, investigating new types and new instruments. And I have thought that a figure of one per cent is a conservative figure for that expense. In line 7 I have used a two per cent reserve for contingencies, which is to care for items of expense that are not included in the previous items.

Mr. Shuler: For instance——

The Witness: If I knew what they were I should put down here what they are. I put that down because an engineer's estimate tends to overrun rather than underrun. Anybody that builds a house knows that. You think you have estimated all of the items of cost and you find the total cost is a little more than you figured on. There is no item [fol. 8055] here for development expense for developing new types of instruments. There is no item in here for patents. But as a general thing the item of contingencies is to cover for the thing if you knew what it was.

Mr. Shuler: I thought that this was based on buying it from the Western Electric?

The Witness: Precisely.

Mr. Shuler: Why would they spend anything for patents?

The Witness: Well, the Western Electric Company might continue making the same type of instruments they made before. They might not change them in any way. There might be no improved instrument. Now the sum of those items amounts to 90 cents. I am reducing this finally to the total cost per station. It is a fact in the business that more sets of instruments are required than there are stations. Instruments are required for operator's use at switchboards, for linemen and repairmen, and a certain stock of instruments is required on hand as a stock to come and go on in handling the business. It runs in general that there are about five per cent greater number of instruments by a telephone company than it has stations, due to these uses that I have just mentioned. So, applying that figure of 1.05 to the figure of ninety cents in line ten gives a figure of 94½ cents.

As I said, the American Company maintans a stock of instruments to insure continuity of supply, and for a number of years the average of that stock has been a little over [fol. 8056] six per cent of the number of outstanding instruments. So on line 13 I have taken six per cent of the $4.50 price, which amounts to twenty-seven cents and to that I have applied certain percentages to determine the annual cost of carrying this stuff. There is shown in lines 15, 16 and 17 a return of eight per cent, and — administrative cost of one per cent, and two per cent for insurance and contingencies. I have not assumed that these instruments deteriorate or depreciate while they are held in stock, because that is a reservoir into which the new instruments are put as they are made. That eleven per cent appearing in Line 18 is the 27 cents per instrument for this reserve stock, amounting to three cents more, which, added to my previous figure, gives a total annual cost per station of 97-5/10 cents. And in the light of that figure I have reached a figure at a trifle under a dollar per station per year is a fair figure.

Mr. Shuler: There is no salvage in this stuff?

The Witness: Yes, sir, that is taken care of in my seven per cent credit to the depreciation account.

Mr. Shuler: You bring that down as something else to seven.

The Witness: There is a salvage of about fifteen or twenty per cent.

Mr. Shuler: You would not count that salvage in at seven per cent; it would be considerably more.

The Witness: Something more.

Mr. Shuler: What is the life of an instrument?

[fol. 8057] The Witness: That is a rather difficult thing to say.

Mr. Shuler: What did you take in your estimate.

The Witness: My best judgment is that the life is somewhere between ten and twelve years. I should say about eleven years.

And thereupon the further hearing of this matter was adjourned until Wednesday Morning, February 27th, 1924, at 10:00 o'clock, A. M.

[fol. 8058] Wednesday Morning Session

February 27, 1924.

And also FREDERICK LELAND RHODES, resuming the stand for further examination, in chief, continued his testimony as follows:

Examined by Mr. Burr:

Q. Mr. Rhodes, at the close of yesterday afterooon session, you had described a number of services rendered by the departments of the General Staff of the American Company to the associated companies, including the Ohio Bell Telephone Company. Will you classify those services broadly?

A. Yes. They can be broadly divided into two classes: First, work on problems for all of the associated companies in which the Ohio company participates, that is, these broad developments that affect all of the companies; and, second, there is a class of specific work which is undertaken at the request of the officers of the Ohio Company relating to problems arising peculiarly in the State of Ohio about which they require consulting advice.

Q. Tell us something of the records of the Department of Development and Research and how that Department keeps in touch with new ideas?

A. Our Department has complete technical files and records extending from the beginning of the telephone business to the present time. They represent the accumulated tele-
[fol. 8059] phone experience of the world. We also have complete files of telephone patents. All important technical and scientific periodicals and other publications, proceedings of technical societies and congresses of technical people all over the world, come to us, and each copy of every periodical or report is carefully examined by specialists at the time of its receipt and referred to such people in the department as it is known would be interested in it, and in that way we keep thoroughly in touch up to the minute with all new scientific developments for the purpose of studying them to see wherein they may contain anything of benefit to the telephone service.

Q. It is true isn't it that new ideas and improvements originate in countries other than the United States?

A. Some, but not very many. I can recall very few improvements of other than distinctly minor importance that have originated in other countries. The fact of the matter is that telephone engineers and executives from all over the world come to the United States to familiarize themselves with the latest improvements that have been introduced here.

Q. Do the technical departments whose work you have described confine their work solely to improvements and to the development of ideas?

A. Why, no. There is the consulting service which is given. And we certainly do not confine ourselves to our own ideas, because we take good ideas from whatever source they may come, wherever they may arise and we undertake [fol. 8060] to apply those to the business, without regard to their origin. In a good many connections we have to acquire rights under existing patents, and that is done of course.

Q. Yes. In referring to ideas I should have specified ideas originating with members of the General Staff.

A. Did I cover that sufficiently in my answer?

Q. Yes. If some invention were to be made or some idea were to be conceived by an employee of the Ohio Bell Telephone Company, would these departments of the American Company have any function to perform with reference to such an idea or invention?

A. Yes, we are prepared to take that idea up and develop it. The men in the field know that they can send those ideas to the staff, and they know that they will be thoroughly studied and worked up. Their own organization is not set up to do that thing and it is an undesirable thing to have indescriminate experimenting going on all through a working plant. That is one of the things we try to avoid, because it has a bad reaction on the service if the working plant is being made a laboratory. We concentrate on this work in some small section of the plant and endeavor to study it extensively there.

Q. Explain if you please the relationship of the general staff to the engineers of the Ohio Bell Telephone Company?

A. Well, there is a specialization of functions. Engineers of the General Staff are in constant touch and communication with these engineers of the associated companies in the field. These engineers in the field are constructing [fol. 8061] and operating and maintaining their plants. The engineers on the staff organization are experimenting, developing and standardizing. The difference is something like that, that exists in the army, where the field officers are concerned with where to place their troops and guns and when to fire and what to fire at, and at that particular time they do not have to worry about the equipment of the troops or the design of the guns or the ammunition. That is done by the staff of the army, which is always in touch with the field and solely utilizes the field experience in the staff plans. And it is that arrangement that we follow. Now by concentrating this research and development work in the staff it means that instead of in addition to the present field engineering forces of the associated companies instead of in addition to their forces there having to be nu-bers of consulting engineers scattered around the country in each operating group, we have this one department which does the experimenting and research and consulting engineering for the entire system. It follows from that that instead of this staff being in any sense a duplication of work done in the field, it distinctly operates to prevent duplication. It does not mean that there is a difference in ability between these engineers on the staff and those in the field, but it does mean that they are engaged on different lines of problems, and the engineers of the staff are segregated in an environment where they are given the facilities for this experimental work and are devoting their lives to it. It does not

[fol. 8062] follow but what one of the engineers in the field exchanging jobs with the man on the staff would perform that work as well, or vice versa, after the men became accustomed to their jobs, and in fact there is a circulation of men from the field to the staff and from the staff out to the field.

Q. Is there any of this work of development and research which you have described which goes on without the knowledge of the engineers of the associated companies, that is to say, without their knowing about it while it is going on or afterwards even?

A. Well, yes. They are not excluded from knowing about it, that is, it is not kept as a secret from them. They come down to New York and very frequently inquire what there is going on there and they are told. But in the ordinary course of our operations there are many things that are submitted to us that we try out and find out are not suitable in the plant, and in many cases they do not know that that is going on unless they may happen to inquire if the same device is suggested to them, they will inquire of us what we know about it and we tell them. There is a great deal of the detail work in connection with some of the major projects that we are engaged on that they ordinarily would not know about until the work is completed and something definite which they can use is placed at their disposal.

Q. Is it true that the associated companies sometimes propose things to the General Staff which have already been found impractical, and if so, what happens?

A. Why, before we tell them what our experience has [fol. 8063] been we go back to our records and we find that we looked into this thing so many years ago and found for these reasons it was not advisable to recommend it, and we tell them what those reasons are, what our experience has been with it.

Q. And in that way the associated companies avoid the expense and labor of following out the idea and further investigating it?

A. That is true, and in addition to that, they are helped not to make mistakes.

Mr. Dotson: Who originated and established the coordination of these departments that you have just described.

The Witness: That has been a gradual growth and evolution that has gone on through a period of years. We had

of course a specialization of legal, accounting and technical departments, but when it first came into the business the engineering department was very small and it was not organized the way these organization diagrams show. As the work has increased, it has become necessary to continually specialize the functions further.

Mr. Dotson: It then was originated and has been established by the American Company?

The Witness: Yes, sir.

Mr. Dotson: Is it under the direction of the American Company that this shifting of engineers from the field to the experimental work and vice versa is carried on?

The Witness: It is a matter of negotiation between these [fol. 8064] people in the staff and the people in the associated companies. For instance, I recently wanted a man in my own organization and I took it up with one of the field departments of the New York Telephone Company to see if I could arrange to transfer a man to my department. And they were agreeable to it. Shortly after, one of my men left our organization to go into other work, and I applied to this same man in the New York Telephone Company to see if he could let me have another man, and he said no, that he was very short handed as a result of giving me that other man, and he didn't have anybody I could have. That is the way the proposition goes on.

Mr. Dotson: However, if he had not been short-handed, if he had had a man available, couldn't the American Company have commanded that man to transfer his activities in accordance with their wish?

The Witness: Possibly we might have, but we have never done it that way. That is, the purpose is to have a man in the position where he can do the most good to the entire system.

Mr. Dotson: This transferring of men as you have described, what is generally the purpose of that? Is that to have the man more generally informed in the work, in the field and in the experimental developments.

The Witness: Not so much that. It is to put the man in the position where he is the most needed. Now what happens frequently is that a man from the staff will be borrowed by an associated company to set some particular line of [fol. 8065] work going. Now if he has been several months with that associated company and they find out how he performs, they may say, "We would like to have that man in

our own organization. He can help us here." And then that is take- up with the man that he reports to on the staff, and — he can be spared to advantage, he will remain with that associated company.

Mr. Dotson: Well, that is taken up with the man under whose supervision he was working, simply for the purpose of enabling that party to provide someone else in his place when he is taken out, so that the work will not be interrupted nor in any way disturbed. That is really the purpose of pursuing that course?

The Witness: I am not sure I quite got the point of that.

Mr. Dotson: What I am getting at is, the American Company you say requests this transfer of the services of a man.

The Witness: Or vice versa.

Mr. Dotson: Or vice versa. For instance that is done largely in that way for the purpose of not interrupting or disturbing the work that he is carrying on, by just going ahead and taking him at once under your direct command and leaving them without anyone else to take his place. By that method you give the party a chance to supply someone in his place.

The Witness: Or we may not have anybody from that company at all. They may not be in position to have any- [fol. 8066] body come in. We always endeavor to meet the request of the associated companies for men, but we do not carry an excess force or have men trained for that purpose.

Mr. Dotson: That was what I was trying to get at, whether you had regard for the service.

The Witness: Yes.

By Mr. Burr;

Q. Isn't it true, Mr. Rhodes, that many men have gone from the General Staff of the American Company to the Ohio Bell Company and are here now and are from time to time in the employ of the company?

A. I understand that is the case, yes.

Q. And isn't the opposite also true, that men have gone from the Ohio Company to the American Company's General Staff?

A. I think that is so, but I could not recall the names of those people right now, but — is the general custom with all the associated companies.

Q. I call your attention to Mr. Crunden as an example?

A. Yes.

Mr. Dotson: Isn't it true that all of the men that are employed by the Staff are taken from the associated companies' employment?

The Witness: All of them?

Mr. Dotson: Yes.

The Witness: No, No, a very small percentage.

Mr. Dotson: Have you any way of knowing about what percentage?

The Witness: Why, no, but I should be surprised if it were more than ten per cent. I might mention there that [fol. 8067] in many of our technical departments we have men whose fundamental training is different from that, that would be suitable for men in an associated company. Now in our department of transmission development work we have a considerable number of mathematical physicists with advance degrees, men with doctor of philosophy degree, who have had highly specialized training. Those men are attracted by the particular kind of research work that we are carrying on.

Mr. Dotson: Now you take into your employment men that are graduated from colleges and universities in certain electrical lines of work?

The Witness: Yes, and we put them through an course of intensive training that lasts several months.

Mr. Burr: I think Mr. Rhodes testified day before yesterday, Mr. Dotson, although perhaps you did not hear him, that several men of that kind have gone to the American Company from universities of this state.

Mr. Dotson: I remember that.

Mr. Shuler: The same thing in 1919. He testified the same in 1919, Ohio State, Dennison and Miami.

The Witness: I think very likely because it was true then.

Q. What are the relations between the General Staff of the American Company and the Western Electric Company?

A. The Western Electric Company is the manufacturing branch of the Bell System, and their engineers work in close co-operation with the engineers of the General Staff [fol. 8068] of the American Company. The headquarters of both the General Staff and the Engineering Department of the Western Electric Company are in New York, not far from each other. Now the division of work between the two groups of engineers is this. The General Staff in this case studies the needs of the business, and in t

work it keeps in close touch with the men of the associated companies in the field, freely consults with them. Whether certain types of apparatus are to be manufactured at all is not determined by the Western Electric Company. The General Staff determines that and it determines it not from the point of view of what the manufacturer desires to sell but from the point of view of what is needed to best provide the service for the public. In work of that kind there is very important work in laying down the conditions to be met by a new piece of apparatus before the manufacturing organization is brought in. Of course they are only brought into our development work when some new device which is an article of manufacture is required. They are not brought into consultation with us on very much of our work. For instance, the traffice matters or electrical disturbances from foreign wires, or construction methods or plant operating methods, or fundamental plans. But when there is some work being done which is going to crystalize in a manufactured piece of apparatus, they do come in, and on that work the Western Electric Company does the laboratory work, what might be called the manufacturing engineering, the mechanical design, after the General Staff [fol. 8069] has done the fundamental preparatory work, studying the needs and requirements of the business. Now the object of that is that what is developed will be the thing that the General Staff has found is best suited to serve the public most satisfactorily. The Western Electric Company is told by the Staff engineers what results might be accomplished by the piece of apparatus, and their engineers and our engineers very frequently confer during the design of the apparatus. Then when the Western Electric work of design is completed our General Staff passes on the final solution. It makes tests and determines whether the apparatus that is devised is that which is best suited to perform the desired functions. If our tests show that that is so, then it is recommended as standard to the associated companies.

Q. Have you a model of line and cut-off relays?

A. I have, but I do not know that it is necessary to bring that in in that connection. My general statement has covered what it is, and that is only one example.

Q. We will omit that and also the model of the line and cut-off relays of the new type?

A. Yes.

Q. How does the General Staff make known the results of its work to the Associated companies?

A. As I have said, there is close contact and frequent conferences both by the staff engineers going into the field and the field engineers coming to the headquarters of the Staff. In addition to — there is a constant flow of information on which is sent out in the form of what we call general [fol. 8070] engineering circulars, carefully prepared statements describing various improvements in apparatus in methods. The work of the Department of Development and Research crystal-izes in what are termed bulletins, which are rather more extensive publications than the general engineering circulars. Then apparatus is frequently described in specifications which are sent out by our department. The traffic end of the work send out a series of traffic circulars. The commercial engineer also sends out commercial letters and bulletins.

In order to show the continuous nature of that work, I have just jotted down the numbers of these various forms of information that have been sent out. In recent years, and I have the information for the four years beginning with 1920 and ending with 1923, in that period of time there was sent out 463 general engineering circulars, 67 traffic circulars, 156 specifications, 121 development and research bulletins, and 156 commercial letters and circulars. That means in that four years' period these various pieces of information were coming to the associated companies at the rate of between four and five every week, which I think serves to show the continuous nature of the service.

Q. Have you a list of the titles of those circulars and letters and other information?

A. I have.

Mr. Burr: It may be marked Exhibit 84 and is offered in evidence.

[fol. 8071] And thereupon the paper writing above referred to was marked for the purposes of identification and was offered and admitted in evidence on behalf of the Ohio Bell Telephone Company and is herewith submitted, marked Rhodes' Exhibit Number 84, and made a part hereof.

The Witness: These are given by title only and I think they will serve by the titles to show the scope of the subjects covered.

Q. Does that cover all of the subjects?
A. No, they are typical ones.

Mr. Kinnison: Are those gotten out by Western Electric or by the American Company?
The Witness: By the American Company.

Q. Have you also a bulletin on transmission equiv-lents?
A. Why, I had it around it but I think I gave it to Mr. Kositzky.

Q. Very well. We will omit that one. Have you a bulletin known as bulletin Number 3, covering the matter of sags of suspension strands of aerial cable?
A. Yes, that is a rather typical one of our very early bulletins which shows the form in which this information was put up. This shows a convenient method of arriving at the proper sag to allow in suspension strands for carrying aerial cable in order that safe loads will not be exceeded.

Mr. Burr: It may be marked Exhibit 85 and is offered in [fol. 8072] evidence.

And thereupon the bulletin last above referred to was marked for the purposes of identification and was offered and admitted in evidence on behalf of the Ohio Bell Telephone Company, and is herewith submitted, marked Rhodes' Exhibit Number 85, and made a part hereof.

Q. In order to shorten the inquiry, I will ask you with respect to only one more of the bulletins, namely, Bulletin Number 63 on power plant and main distributing frame grounding systems. Have you copies of that bulletin available?

A. Yes, that is a later bulletin than the other one and is a type of a rather smaller bulletin than the one that has just been put in.

Mr. Burr: It may be marked Rhodes' Exhibit Number 86 and is offered in evidence.

And thereupon the bulletin above referred to was marked for the purposes of identification and was offered and ad-

mitted in evidence on behalf of the Ohio Bell Telephone Company, and is herewith submitted, marked Rhodes' Exhibit Number 86, and made a part hereof.

Mr. Shuler: When was this gotten out?

The Witness: Which one is that?

Mr. Shuler: 84. This is just the names of some of the things.

The Witness: This is just the names of some of them. [fol. 8073] I should say it was gotten out within the last year.

Mr. Shuler: The things mentioned there were gotten out over a period of many years?

The Witness: Over a period of several years. I purposely went back over a period of years to get a representative range of titles, showing the character of the work.

Mr. Shuler: How many are there.

The Witness: In 1923 we sent out 161 general engineering circulars, 15 traffic circulars, 55 specifications, 48 development and research bulletins, and 20 commercial letters, circulars and bulletins.

Q. That work is still going on is it?

A. Oh, yes, indeed. In fact up to comparatively recently there have been some 34 of the general circulars sent out during the year 1924.

Q. To what extent might we say that as a general thing the functions of the General Staff are those of a clearing house?

A. Well, I do not think that is an apt term to describe the character of the greater part of our work. There is of course a small portion of our work that is of that nature, but "clearing house" implies to me the collecting and assembling and passing out of data. Now the greater part of our work goes further than that. We analyze and compare and study and experiment and test and devise and eliminate and improve. The policy is not simply one of handing out collective information that comes in from these companies to all of the companies, but our policy in all branches of [fol. 8074] our work is not to wait until an associated company finds itself throttled and hampered as a result of its expansions, the expansion of its business, beyond a point where existing means and methods are adequate, but we aim to anticipate the conditions of growth and the new requirements that they bring about sufficiently in advance so that

we shall be able to determine and have ready for service thoroughly tried out materials, apparatus and methods when these are required, so that the orderly expansion of the business of the associated companies will not be choked. It is what you might I think aptly refer to as a policy of preparedness.

Mr. Kinnison: Does that mean, Mr. Rhodes, that your associated companies, after they have developed a certain idea or determined that a certain idea may be worthy of investigation and submit it to your General Staff, the word of your General Staff is final.

The Witness: Why they do generally accept it as final, because I think they have confidence in the work that we have done in the past in recommending it, but if I get your point, if somebody in an associated company gets an idea and makes an invention, he is at liberty to take out a patent on that invention and he can dispose of it to the American Company if he wishes or he can dispose of it to somebody else. He is under no contract to turn it in to us.

Mr. Kinnison: I did not mean it in quite that sense. The disapp-oval of the feasibility of an idea by your General [fol. 8075] Staff would prevent the further development of it by one of your associated companies?

The Witness: Not necessarily. There is no rule in regard to that. But what happens is, after we have made these tests, the man who has this idea come in and we go over it with him and tell him what we have done and see if he has any further ideas about it.

By Mr. Burr:

Q. Then after that he is free to do as he pleases?
A. He is free to do as he pleases.

Mr. Kinnison: But as a matter of fact you constitute his market do you not?

The Witness: In a large sense, yes.

Mr. Burr: But he may market his patent elsewhere if he wants to?

The Witness: Yes, he may handle it precisely as any individual could do.

By Mr. Burr:

Q. If he did handle it and develop it by himself and it turned out to be and advantageous thing for the telephone

business, would or would not your company try to avail itself of the improvement, whatever it was?

A. We would.

Commissioner Poor: In other words, in the majority of cases, you mean, Mr. Rhodes you either convince him that his plan is not feasible or practical or he convinces you that it is practical.

The Witness: That is right.

Q. Does the General Staff enforce its ideas on the associated companies? That question is in line with the inquiry [fol. 8076] which has just been going on.

Mr. Dotson: You mean generally?

Mr. Burr: Yes, generally speaking. We have been talking about patented devices or ideas.

The Witness: Well, there is no line of authority between these General Staff Departments and the corresponding departments in the associated companies. Now an official of an associated company keeps in close touch with the General Staff Department, which is working on the particular things that arise in his department, and he keeps himself always informed as to the best methods and practices that our Staff Departments have worked out in his line of work. But his specific instructions come to him from the executive offices of his own associated company, and the relation with the staff is merely a consulting one.

Mr. Dotson: Well, the American Company has the largest financial interest in these associated companies has it not?

The Witness: In most of them, yes, sir. There are two in which it has not.

Mr. Dotson: What are those two?

The Witness: The Bell Company of Cincinnati and the Southern New England Company, which operates in the State of Connecticut.

Mr. Dotson: In that sense it is of interest and importance to the American Company, and isn't it so regarded, to have the associated companies avail themselves of these improve- [fol. 8077] ments that make for economy and efficiency.

The Witness: I think it is and they do, sir, very largely.

Q. You have been speaking of some of the services rendered under the license contract. Tell the Commission if you know whether different methods have been followed from time to time in making payment for the services, and

if they have, you may state what in a general way they have been?

A. Different methods have been followed. In the beginning of the business the payment made by the associated company was fourteen dollars a year per set of instruments supplied by the American Company. That was reduced from time to time.

Mr. Shuler: May I interrupt there a minute, Mr. Burr?

Mr. Burr: Yes, Mr. Shuler.

Mr. Shuler: I want to get it clear in my mind.

Mr. Burr: Yes.

Mr. Shuler: Are those instruments that were then supplied different from what they are supplying now?

The Witness: Yes.

Mr. Shuler: It was the whole telephone?

The Witness: No, it was also the transmitter receiver and induction coil.

Mr. Shuler: Just the same parts that are supplied now.

The Witness: Yes, but they were different types of instruments.

[fol. 8078] Mr. Shuler: No, I did not mean that.

The Witness: Then after a while the payment which was made was based on the amount that was received by an associated company from the subscriber on each particular set; that is, if a set of instruments was placed at a station where the subscribers paid eight dollars a month, the amount paid to the American Company was a greater amount than on a set of instruments that they placed at a station where the payment by the subscriber was four dollars a month. Now that resulted in a very complex accounting and it was a burden to both the associated company and the American Company to keep track of those payments on individual instruments. In 1902 that complexity was avoided by placing the charge for the services upon a per cent of the gross revenue. You see the matter pf porportioning it to the amount that was received from the subscriber was a step towards the percentage of the gross revenue method of charge. It was changed over entirely on that basis in 1902. At the time it was made the payments from all of the companies from that source were reduced. That is the four and one half per cent of the gross revenue reduced the payments under what had been paid before that time.

Q. Why wouldn't it be better instead of the present

method of payment under the license contract for the Ohio Bell Company and the other associated companies to pay for the actual services rendered by the General Staff from time to time as those services are rendered.

Mr. Shuler: You are making him an expert on that phase [fol. 8079] of the whole question are you?

Mr. Burr: I think you should answer that question.

Mr. Shuler: So that we may cross-examine on that point.

Mr. Burr: I do not see any reason why he should not answer that question.

The Witness: I do not see how our work, which covers literally hundreds of different unrelated jobs, could be prorated by companies or states and charged for item by item. The only practical way that we can do seems to be to handle it broadly on the present basis. Now under this present basis or on this present basis each associated company is free at all times to come to the General Staff and get the best information, advice, and assistance obtainable without considering the cost of each one of these specivid requests. If each associated company were required to make separate payments every time it asked a question, it might be reluctant to do so and the result would be that they would tend to fall behind in efficiency.

Now we have this situation, that in many instances the same or similar questions would be asked by different associated companies, and on the specific payment ba-is there would be a tendency to duplication of charges. Motives of economy might induce each associated company that was asking a question to request that the investigation of that subject be confined to the narrowest limits which would serve its purpose. Now piecemeal investigation of questions of that character would increase the expense of the [fol. 8080] investigation as a whole to all companies and would delay its results. Motives of economy might tend to deter each company from incurring expense for work looking into the future in which it might not be apparent to that company that it had at the time any immediate interest. And further, each company would tend to be deterred from requesting by itself investigation of broad and general questions in which all companies were or might be interested, as each company might feel that all of the companies would contribute to it.

Then there are these things which I have referred to be-

fore, which are tried out and found to be unsuccessful, mistakes which are avoided, patents which are examined and rejected. It would be an impracticable thing to bill directly for work of this kind which involves negative results. The existing arrangement encourages all of the associated companies to bring to the staff all of the questions in which they are interested, and permits the most thorough and broad investigation by the staff.

Q. I think you testified on the first day of the hearing as to whether or not the American Company operates any local telephone exchanges, but in order to make sure I will ask you the question again. Does it or does it not?

A. It does not.

Q. I believe that you also described in a general way that is the long lines department of the American Company, but I will ask you again what the department is.

A. It is the department which builds, operates and main-
[fol. 8081] tains the long lines over which are handled the messages which go from the territory of one company in general to the territory of another company. I was going to say that that organization is entirely separate and independent from the General Staff organization, with the exception, I think, of three men in the legal department of the Staff who do some legal work for the long lines Department.

Q. Isn't it true that you would need your present engineering staff in connection with the operation of the long lines service, leaving out of the consideration for the moment the question of the associated companies.

A. Why we would need some of it, but not anything like the proportions in which it exists, because a great deal of the work that is done by the Staff is in connection with subjects involved in exchange operation.

Q. So that while the long lines department would need what would amount to a comparatively small portion or proportion of the service rendered, a great part of the service is necessary to the operation of the associated companies.

A. That is true. Some of the work that we do on toll-line construction is valuable both to the associated companies and the Long Lines, and that is also true of some of the work on loading and some of the work on repeaters.

Q. Yes, that is exactly so. Now can you give some fur-

ther examples of the work completed by the General Staff?

A. Yes, I have a list which relates to plant matters only. I have not included traffic and commercial problems in this, [fol. 8082] but it covers equipment and outside plant and transmission and protection subjects.

Mr. Burr: The list may be marked Rhodes' Exhibit 87 and is offered in evidence.

And thereupon the list above referred to was marked for the purposes of identification and was offered and admitted in evidence on behalf of the Ohio Bell Telephone Company, and is herewith submitted, marked Rhodes' Exhibit Number 87.

Q. I notice Exhibit Number 87 is labeled, "Some cases of work completed." Is the list intended to represent anything near all of the cases of work completed?

Mr. Shuler: Is that kind of questtion competent? What it is intended to do is most vague and indefinite.

Mr. Burr: The question is withdrawn.

Q. Are there other cases of work completed by the General Staff covering plant matters only, and which are not included in the list set forth in Exhibit 87?

A. I think I can answer that best by saying that this list, which covers something over eighteen pages of titles, bears on the last page this statement, "Work has also been completed on about 800 other subjects."

Q. Can you also indicate some of the work which the General Staff now has on hand?

A. There is possibly some little error in this due to the fact that this list of subjects covered cases of work on hand [fol. 8083] at the beginning of this year. Now some few of these have been completed since that time, but this represented the facts of the case as of the beginning of this year.

Q. You are now referring to a list of cases of work on hand are you?

A. Yes.

Mr. Burr: It may be marked Exhibit 88 and offered in evidence.

And thereupon the list above referred to was marked for the purposes of identification and was offered and ad-

mitted in evidence on behalf of the Ohio Bell Telephone Company, and is herewith submitted marked Rhodes' Exhibit Number 88, and made a part hereof.

The Witness: I might say in connection that this, as in the case of the other list, is not complete. It covers a little over 11 pages of subjects, and the last page bears the statement that work is also on hand for more than 400 subjects.

Mr. Shuler: Do they read these things on company time?

The Witness: Why I do not believe that outside of one or two of my assistants and myself, they have ever seen a list of this kind.

Q. Based on your experience in the past and from what you know of existing conditions, that is to say, conditions existing at the present time, would you say that the art of telephone has or has not reached the point of stabilization [fol. 8084] such that the work of development and research would be of less importance in the future than it has been in the past?

A. It has distinctly not. Every improvement that we make leads to the possibility of still other improvements. As the business grows the opportunity for economy and improvements broadens out. In the last three years we have completed a great many subjects of great importance to the associated companies. I can give you a few examples of those if you like.

Q. I wish you would.

A. I haven't enough data with me to give very many of these examples from the work of other sections of the department, so I have drawn these examples quite largely from the section for which I am immediately responsible and with the work of which I am naturally the most familiar. Take the matter that I spoke of, of the extension of the use of 24 gauge instead of 22 gauge, wires smaller than 1200 pair—cables smaller than 1200 pairs, that came into use in 1922,—It really came into use the latter part of 1921, but 1922 was the first full year in which the associated companies availed themselves of that. In that year the first cost of cables on account of that work installed in the Bell System was $800,000 less than would have been the cost if the previous type had been employed.

Q. That you say was perfected and given out by the de-

partment of development and research in the latter part of 1921?

A. Yes.

Q. You may proceed?

A. Now that saving of $800,000.00 I think will be con- [fol. 8085] siderably larger in 1923, but the statistics for the use of cable for the year are not as yet available in complete from. I should suspect it would run well over a million dollars in 1923. Now we completed in 1922 work on making 24 gauge wires available for 900 pair cable used principally underground. The previous figure I gave was for aerial cables of 600 pairs and more. By the use of this fine wire in 900 pair cable, there was a first cost saving for the system of $200,000. That saving became available for the year 1923. The development of the 450 pair 19 gauge cable that I referred to yesterday or the day before first began to come into use in 1919, and it was subsequent to that time in 1920 and '21 that it grew up to a considerable use, and that has saved $250,000 a year.

Q. That is, it has saved and will probably save more every year?

A. With the increasing use of cable, yes.

Q. Yes?

A. In 1922, we made available a means for reducing the capacity unbalance in '22 and 24 gauge cables so as to permit all those small cables in exchange trunks being loaded, equipped with loading coils. The previous methods of manufacturing those cables were not such that those cables were available for loading. That alone will effect a saving of about $400,000 a year in the first cost of cables in the Bell System. The adjustment in sheath which I have described was started in 1921 and came into full effect in 1923. That has resulted in a first cost saving of $200,000.00 a year in the Bell System. The bronze drop [fol. 8086] wire which I spoke of came into use in the latter part of 1921, effecting a saving of about $175,000.00 a year in the entire system. Last year by changing our requirements for creosoting yellow pine poles to permit the use of poles that had formerly been rejected, that is, our experience in following up the effect of decay in those poles, indicated that we could accept certain types of knots that had previously been excluded as a potent source of decay, by modifying our requirements slightly in that respect a

first cost saving of about $150,000.00 a year was made in the system. I referred to the use of a light weight easily operated coal derrick to be applied to automobile trucks to be used in connection with the power wench on that truck to save labor in erecting poles, in moving poles, in pulling poles from the ground, handling cases of loading coils and work of that kind. It is conservatively estimated that when they type of pole derrick comes into general use it will result in an annual saving of more than a million dollars a year in the entire system. Work was done between 1921 and 1923 *no* more economical wiring plans for subscribers' stations, which results in a saving of approximately $300,000.00 a year in the system. Well, there are a number of items which I could read, ranging along in hundreds of thousands of dollars, some of them down to as small as $50,000.00 a year, perhaps fifteen or twenty of those items but those items I have given are typical of the kind of work that is being done right along from year to year.

Mr. Dotson: The amounts given in your answers of [fol. 8087] savings of first costs, those amounts pertain to all the associated companies in general, not to any particular one; that is right?

The Witness: That is we estimated—The estimate based on the year's consumption of that type of material in the whole system.

Mr. Dotson: Those savings pertain to the savings of only one year? And if so, what year does that refer to?

The Witness: To what we will consider a normal year, 1922 or 1923. That is, they are based on the entire consumption of material in that year.

Mr. Burr: Yes, in that particular year.

The Witness: Yes.

Mr. Dotson: There is no allocation of these savings to the Ohio Bell Company that you could refer to.

The Witness: I have not made such allocation myself, no.

Mr. Burr: We will have other witnesses whom we may interrogate on that subject.

Mr. Dotson: I might forget it then.

Mr. Burr: I hope you won't.

Q. In your opinion is it necessary for the proper handling of its business that an operating company, such as

the Ohio Bell Telephone Company, shall put itself in a position to secure to the fullest extent the results of future development and research in the telephone art?

A. It is.

[fol. 8088] Mr. Dotson: Read that question.

Question read.

Mr. Burr: I am not asking him whether it is necessary to secure results of development brought out by the American Company, but in general, in view of his knowledge of the art as it has so far progressed and the probable future requirements of the art as it expands from year to year.

Mr. Dotson: The peculiar thing about that question is that it does not seemingly throw light on anything.

Commissioner Maullar: It is just his opinion.

Mr. Dotson: It is just his opinion as to the necessity of having that. But I mean it does not throw any light on the question we are hearing at all. The question is whether it is necessary for them to have this service from the American Company.

Mr. Shuler: At this price.

Q. What would you say, Mr. Rhodes, as to the necessity for increasing as the art develops the amount available for development and research?

A. Why it seems to me that it is very desirable to have that go on, because as the subject broadens out there are vast amounts of new projects which, considering the business as a whole, it is desirable to have attacked and have improvements and economies made in those things. As the art broadens out and more subjects are investigated, it means that more people are required to do it.

Q. Has the art broadened since the year 1918?

[fol. 8089] A. It has.

Mr. Shuler: I would like to ask him on that a question, because I want to base some later questions on it. You are now capable of answering questions as to the increased number of employees and the expenses of the staff are you?

The Witness: I am as to the number of employees. I am not as to the expenses.

Mr. Shuler: Then how can he testify in answer to Mr. Burr's question, if he is not familiar with all of them; how is he competent to answer Mr. Burr's question? In other words, I want him to be just as competent to answer questions on cross-examination as he is on direct.

Commissioner Maullar: I don't see where the number of employees has anything to do with that question or the answer, if you are referring to the immediate question and answer.

Mr. Shuler: But my point is this, that Mr. Burr is asking him whether it won't render necessary greater work in the future than in the past. If he does not know how much work has been done, how much has been expended in the past, how it has increased in the past, how has he any idea what the future may bring forth in the way of increased work, increased expenses and increased employees? Those are questions I would like to be able to cross-examine on, and I am asking now for this particular reason, that I want to know whether this witness is going to be competent to answer those questions.

[fol. 8090] Commissioner Poor: If that was the effect of your question that is all right.

Commissioner Maullar: I understood the question that the witness answered to be as to his opinion of the increased employment or number of persons employed only. Is that right?

(Last two questions by Mr. Burr and answers thereto read.)

Commissioner Poor: If you are objecting to the second question, there should be a foundation laid as to whether he knows.

Mr. Burr: Well, the question has been answered and I have passed to another question. Now if counsel want to cross-examine, Mr. Rhodes on any subject, all right, but I would like to go on with my examination.

Q. Do you find it necessary in the expansion of the art to consider an increasing number of telephone problems and questions from time to time?

A. Yes, we do. It may not be competent in answering that question, but it seems to me that it is at least illuminating in that connection to consider the increase that has taken place in our technical departments which are doing this work, and I can give you the number of employees. We were talking about the year 1915. That was before the department of operation and engineering and the department of development and research were separated. They were one department then known as the engineering department. At that time we had 350 employees on that

[fol. 8091] Mr. Shuler: May I get something straight in my mind? "On that work." You mean the work you have been speaking about in the last two days?

The Witness: Yes, sir.

Mr. Shuler: That is so that it will not be said that it is something else?

The Witness: That is what I mean.

Mr. Shuler: The same work then?

The Witness: Same work and on the same line of work, but of course broadens out by adding more problems of various kinds. At the end of December, 1923, we had 892 employees.

Q. Do you know of any company or agency from which the Ohio Bell Telephone Company could obtain services similar to those which you have described at a less cost to it than the compensation paid by the Ohio Company to the American Company for the services.

Mr. Shuler: I object to the question. How does this witness know what services the Ohio Bell Telephone Company has called upon them for? If he would specify what services specifically they have rendered the Ohio Bell, then well and good.

The Court: I think the general answers of the witnesses so far have disclosed that he does not know of any cases, any services rendered or asked by the Ohio Bell, and I do not believe he can draw a comparison without that foundation.

Mr. Burr: Note an exception, and we will bring it out [fol. 8092] by another witness.

Mr. Kinnison: It is a matter of cross-examination anyhow.

Q. Did you testify on the subject of the services rendered by the American Company under the license contract which was in issue in the so-called Houston case, decided by the United States Supreme Court?

A. I did.

Q. Did you also testify on the same subject in the so-called Southwestern Bell Missouri Case, decided by the United States Supreme Court?

A. Yes, sir.

Mr. Kinnison: What do you mean? Last question.

Mr. Shuler: I do not see the materiality of it? You are not trying these cases before this Commission.

Mr. Kinnison: Are you referring to the last question, as to whether or not they should get this same or a similar service for a less cost?

Commissioner Maullar: He testified as to this four and one-half per cent contract in the Houston case, and he wants to know if he testified to the same contract in the Missouri case.

Mr. Kinnison: We object.

And thereupon the Commissioner overruled the above objection.

Q. Were the services rendered the associated company in those two cases substantially as those rendered the Ohio Bell Telephone Company?

Mr. Shuler: We object. We do not know what the serv-
[fol. 8093] ices were in that case testified to in the first place. I do not see how it has any materiality.

Commissioner Poor: Do you say the witness does not know?

Mr. Shuler: If he did know it would not make any difference.

Mr. Burr: He testified in the case.

Mr. Shuler: We do not know what he testified to in the case.

Mr. Burr: I did not ask him that.

Mr. Shuler: No, but I know what your conclusion is, that you are going to draw in argument.

Commissioner Poor: The objection is overruled.

Mr. Shuler: Note an exception.

The Witness: Yes, I testified on the services that were performed at that time.

Q. Were the services the same as those performed under the contract between the American Company and the Ohio Bell Company?

Mr. Kinnsison: I object to the question.

And thereupon the commission overruled the objection, to which ruling of the commission Mr. Kinnison noted his exception.

A. At that time, yes.

Mr. Burr: That is all for the present.

Mr. Shuler: Are you prepared to go ahead with your other witnesses?

Mr. Burr: Yes.

[fol. 8094] Mr. Shuler: If the Commission please, as far as I am concerned—I do not know what the other attorneys think about it—we can make much better time and do it much more intelligently if we will have an opportunity to gather together our questions and arrange them in a somewhat logical order, and I would prefer, if satisfactory to everyone else concerned, to let Mr. Rhodes go for the while, and we will cross-examine then after Mr. Burr has put on all of his witnesses, and cross-examine all of them in order.

Commissioner Poor: That was all arranged prior to actually beginning the case.

Mr. Kinnison: I would like to ask the witness a couple of questions.

Mr. Shuler: I should like to make this request also. Mr. Burr are you going to have anyone here who will be able to testify as to the receipts and expenditures of the A. T. and T. in these matters, and itemized account in a way allocated among Western Electric Services A. T. and T. long distance services and local associated companies, or bring the information so that we might ask about it?

Mr. Burr: I do not understand what you mean.

Mr. Shuler: I would like to know the amount of receipts of A. T. and T. from these license contracts throughout the United States, one; two, I would like to know their expenditures for these services.

Mr. Burr: Mr. Rhodes covered that for a period.

Mr. Shuler: For the year 1920, I understand, he gave us [fol. 8095] two lump sums.

Mr. Burr: Yes.

Mr. Shuler: What I would like to know is for a period of say ten years. I would like to know whether you will bring someone here to testify on that.

Mr. Burr: I don't know, Mr. Shuler at this time how long it would take to get that information together or in what shape it is available, if available at all. I make this point however, that it does not make any difference what the cost of those services is to the American Company, provided the amount paid to the American Company from the standpoint of the Ohio Bell Telephone Company is a fair price for the services rendered. That point was specifically covered by the United States Supreme Court in the Houston case.

Mr. Shuler: Oh, no, it was not, Mr. Burr. I read Mr. Justice Clark's opinion very carefully in that case.

Vol. VIII

TRANSCRIPT OF RECORD

Supreme Court of the United States

OCTOBER TERM, 1936

No. 539

THE OHIO BELL TELEPHONE COMPANY,
APPELLANT,

vs.

THE PUBLIC UTILITIES COMMISSION OF OHIO

APPEAL FROM THE SUPREME COURT OF THE STATE OF OHIO

FILED NOVEMBER 20, 1936.

SUPREME COURT OF THE UNITED STATES

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VOL. VIII.

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Mr. Burr: And there was no evidence in that case as to the cost of the services.

Mr. Shuler: But because the defendant makes a weak case does not make the opinion good law, especially when Justice Clark covered most—Oh, well that is argument.

Mr. Burr: I will see what can be done on the subject, although we do not want to spend a great deal of time looking for information which is not in my judgment relevant to the case.

[fol. 8096] Mr. Shuler: Just on that, it is going to be stricked out, and we would like to know what we have to be prepared to meet as early as possible, because we do not want to hold up these hearings, or hold up the Commission.

Commissioner Poor: I do not suppose there is any way of requiring the company to give us specific information as to what they will produce. We will know that when they produce it.

Mr. Shuler: The question whether or not they are going to do it voluntarily or whether we are going to be compelled to get it otherwise. I would like to know at as early a date as possible the time the commission is going to compel us to go ahead, and I — simply asking it primarily so as to know whether we will have co-operation or opposition in getting it. If we are going to have opposition in getting it, we will start out right away to get it. If we are going to have co-operation we will not do that. I think in all rate making cases, cost of the service is always taken in as an element of the charge. The same way in this case. I think the cost of the services is an element to be taken into consideration by the Commission, if not the sole thing in fixing the price to be charged these companies.

Commissioner Poor: Mr. Shuler, you can elicit that from the representatives of the company if you can, but I do not believe the commission at this time would call upon the company to indicate everything that they will put in in their case [fol. 8097] before hand.

Mr. Shuler: But could not the Commission do this, if it so thinks, to insist that in this matter the A. T. and T. should lay all its cards on the table so to speak, and if they show any inclination not to do so, the Commission is going to take a different attitude towards it. In other words we can often do some things practically that may be we cannot do in another way. It is like a fellow in Jail. You can't put him in but he is there.

Commissioner Poor: The Commission wants all of the facts.

Mr. Shuler: I think so, too, and I think if the Commission will indicate to the A. T. and T. that it thinks it is fair that it should do that, counsel will give it to us. If the Commission on the other hand says to the A. T. and T, "We are helpless in this matter and we can do nothing, they will take a contrary attitude, and say, "We cannot get it for you". I think if this Commission will indicate to Mr. Burr that they would be much chagrined to find that the A. T. and T. would not furnish us that information, Mr. Burr will see that we get it.

Commissioner Maullar: It is up to the A. T. and T. to fix their case.

Mr. Shuler: That is what I think.

Commissioner Poor: There is no question about that.

Mr. Shuler: If the Commission takes the position that it [fol. 8098] is up to them to make the case, that is one question.

Mr. Burr: The duty is on the Ohio Bell Telephone Company to justify the charge. That we propose to do.

Mr. Kinnison: The witness has testified generally as to the class of the service for the A. T. and T. He has gone into the budget. He has not detailed items. Mr. Shuler wants to go into these items to see from whence comes the total. I think that is entirely competent and I think it should be furnished.

Mr. Shuler: For instance if I read the Public Utility report correctly in 1921 the A. T. and T. took in $17,000,000.00 from the associated companies and expended about $9,000,000.00, giving them a net profit of $11,000,000.00.

Mr. Burr: You are mistaken in that.

Mr. Shuler: That is what I want to find out and you are the only ones that I know of that can furnish the information.

Commissioner Poor: If they have not produced the figure that you think they ought to produce, and you desire information, the Commission will then pass on the question as to whether this is proper information, and they will produce it upon our order.

Mr. Harshman: Isn't this proper cross-examination? It certainly is in view of the testimony that the witness has already given.

Commissioner Poor: We have not reached that question.

[fol. 8099] Mr. Harshman: We have not reached it, but Mr. Shuler's idea is merely to have the matter prepared, so that it can go forward without delay. What is the use of having Mr. Rhodes come here when we come on for cross-examination, asking these questions, and finding he has not got the information? Then that means he will have to come back at some later date. That all means delay. Whereas, if it was understood at the present time that the matter could be cleaned up at one cross-examination, and a great deal of time for the Commission and the various counsel represented here saved, that is the idea Mr. Shuler has in mind, I am sure. It is certainly *I* wish to present to the Commission.

Commissioner Poor: The matter is not definite enough for us to pass on it, Mr. Harshman.

Mr. Harshman: I think the Commission has ample power as far as that is concerned from the statute.

Mr. Shuler: So do I. Another thing I want to call the Commission's attention to, and I do not want to be pettifogging in this matter at all—Mr. Rhodes has testified to my personal knowledge for six years before courts and Commissions, and perhaps much longer than that. In every one of those cases I take he has been asked these very questions and has always said he did not know. Now I am only bringing it to the Commission for this reason. It shows to me that Mr. Rhodes does not want to know and he purposely avoids trying to learn anything about it, because Mr. Rhodes [fol. 8100] was asked five years ago these very questions and he said he did not know. I do know that in other cases, Mr. Rhodes, you have testified in, you have been asked the same questions and said you did not know. I simply say this, that Mr. Rhodes is the witness for the A. T. and T., but I think it comes in very poor grace from Mr. Rhodes and from the A. T. and T. to have a witness here who knows he is going to be asked certain questions, and he testifies as to certain phases of the questions, purposely and designedly ignorant of the fact that he knows the Commission ought to know, and that he knows he is going to be asked. Now that is my point.

Commissioner Poor: I can see what you have in mind, but the Commission has no knowledge of that kind and we cannot pass on the question until it comes before us. When the question comes before us we will pass on the admissibility or the competency of it.

Mr. Burr: I do not think the remarks about Mr. Rhodes are quite justified. Mr. Rhodes is not an accounting man and has nothing to do with the accounting. He has certainly given the Commission such knowledge as he has on the subject.

Mr. Shuler: Mr. Rhodes told me this morning that he had been asked these questions before.

Mr. Burr: Yes, that is quite true. Suppose he knows nothing about them? If the shoe was on the other foot, you would be on your feet objecting to the competency of the witness.

[fol. 8101] Mr. Shuler: Let me ask for the purpose of bringing the matter to the Commission's attention at this moment, Mr. Rhodes, are you able to tell the Commission the expenditures of the General Staff during the past five years?

The Witness: No. I have already told them all that I know about it.

Mr. Shuler: Are you willing to bring to this Commission that information?

The Witness: I have not had access to it myself.

Mr. Shuler: You can get in can't you?

Mr. Witness: I can go back and report to the superior officer that I report to that I have been asked the question.

Mr. Shuler: He can give it to you if he is willing?

The Witness: But I cannot go around to all the departments through the company and say, "Give me this thing and that thing." That is out of my line of work.

Mr. Shuler: You have testified here that you knew something of the legal services rendered by your Staff did you not?

The Witness: Yes.

Mr. Shuler: You had to go to another department to get that?

The Witness: I know that this — going on.

[fol. 8102] Mr. Shuler: Answer the question.

The Witness: Yes.

Mr. Shuler: They gave it to you?

The Witness: I didn't go to another department on that. I knew it was going on.

Mr. Shuler: When the accounting matters came up you had to go to another gentleman did you not?

The Witness: As to what the accounting department is doing?

Mr. Shuler: Yes.

The Witness: Oh, yes, I have talked that over to other people.

Mr. Shuler: Will you bring this information?

The Witness: I cannot say whether I can or not.

Mr. Shuler: Can you tell us who will give us the information?

The Witness: I don't know who can. I can go back and say I have been asked for it.

Mr. Kinnison: This matter is a matter of complete record in your office?

The Witness: I do not know that it is. I think it has to be made on the basis of apportionments, and assumptions.

Mr. Shuler: Assumptions particularly.

The Witness: I think so. It would have to be made on assumptions as to how it would be divided, as to how certain expenditures would be divided.

Mr. Burr: Of course it does. Anybody who knows any- [fol. 8103] thing about services of that kind must realize that fact.

Mr. Kinnison: Do you know anyone in your organization who is competent to testify on it?

The Witness: The only man I know who has ever testified on that is one of our vice presidents who was subpœnaed in New York case.

Mr. Kinnison: Who is he?

The Witness: That was Mr. Gifford.

Mr. Kinnison: Is he still with the organization?

The Witness: He is, yes.

Mr. Kinnison: What are his initials?

The Witness: W. S.

Mr. Kinnison: What is his address?

The Witness: 195 Broadway.

Mr. Kinnison: Is he in the accounting department?

The Witness: No, he is operating vice-president, executive vice-president I should say.

Mr. Shuler: Doesn't this company do business in this way in this State in such shape that you can get service on them? They have contracts with the corporate subsidiaries in this State. I think they are doing business in this state. Very slight things have been held by the court to constitute doing business in the state.

Mr. Kinnison: They have property in the state.

Mr. Shuler: But it seems to me the practical hold you have on the subject is the one to use, and that is they will [fol. 8104] not dare to refuse this Commission this information if this Commission will ask for it.

Commissioner Poor: I do not know that they will, Mr. Shuler. The Commission does not know whether the company intends to put this matter in.

Mr. Shuler: Can Mr. Burr give us an answer in a day or so?

Mr. Kinnison: It is apparent that they do not. The witness said that he did not know and there is only one man that does know.

Commissioner Poor: This witness said he did not know. I am sure this member of the Commission will not tell them what they shall put in the case. Wait until they get through their part of the case.

Mr. Burr: Would you like to have Mr. Gifford's testimony in the New York case?

Mr. Shuler: Yes, that is precisely what I would like to have.

Mr. Harshman: No, Mr. Gifford himself.

Mr. Shuler: I would like to have his testimony myself personally. Will you give that to me?

Mr. Burr: I don't know whether I have a copy or not. If you are through with Mr. Rhodes, Mr. Allen may take the stand.

Mr. Kinnison: I want to ask him one or two questions which he has promised to answer for our records. What is the list price from the Western Electric Company to the American Telegraph Company of the transmitter?

[fol. 8105] The Witness: This is the price that the American Company pays, or the open market price.

Mr. Kinnison: The cost to you?

The Witness: The American Company pays the Western Electric Company for the 323 transmitter, $1.48.

Mr. Kinnison: And the receiver?

The Witness: For the 144 receiver, $1.37.

Mr. Kinnison: The induction coils?

The Witness: 46 induction coil, $.57.

Mr. Kinnison: How does that compare with the list price in the general market?

The Witness: The price to the general trade for the corresponding transmitter, which is Number 323-BW is $2.00;

for the 144 AW receiver $2.05; for the number 46 induction coil 85 cents.

Mr. Kinnison: That price is as of what date?

The Witness: As of January 1st, 1924.

Mr. Kinnison: Thank you sir. Is that subject to any further discount?

The Witness: To my best knowledge and belief, no.

[fol. 8106] And also ARCHIBALD J. ALLEN, called as a witness, on behalf of the Ohio Bell Telephone Company, being first duly sworn, testified as follows:

Examined by Mr. Burr:

Q. I believe you were sworn Monday, Mr. Allen?

A. Yes.

Q. You may state your name?

A. Archibald J. Allen.

Q. Where do you live?

A. I live in New York City.

Q. What is your occupation?

A. I am a traffic engineer with the American Telephone and Telegraph Company.

Q. Are you a member of the General Staff of that company?

A. I am.

Q. What telephone experience have you had, Mr. Allen?

A. I started work with the Central District and Printing Telegraph Company, which was the Bell operating company in Pittsburgh in August, 1907. For about one year I was in the office of the chief service Inspector of that company. For the following year I was a district traffice chief in the district of that company which operated the old city of Allegheny, and for about one additional year, I was assistant district supervisor of traffic with headquarters at Butler, Pennsylvania. In 1900 I was offered a position with the American Telephone and Telegraph Company [fol. 8107] on the General Staff in New York City, and on August first of that year I started working on the General Staff in the section which handled the central office records and adjustments of force routines for the American Telephone and Telegraph Company.

Q. By those routines you have reference to the proper

routines and methods for providing the operating force with which to handle the traffice in the central offices of the company?

A. That section that I was working in had charge of the studies and the preparing of necessary instructions for carrying on that work on the part of the associated companies, yes.

Mr. Dotson: If you will state what you want this witness to testify to, we will be willing to let the record show that we accept his qualification to that extent, and you need not go through the routine of qualifying him.

Mr. Burr: We are just about through with the qualifications, and it will be short if I go on with the next question.

Q. When was it you entered that particular department of the American Company?

A. In August, 1910.

Q. What have you been doing since that time?

A. I continued work in that department until February, 1920, when I was placed in charge of the section handling that work, and since August of the year 1923, I have had general charge of the section of the traffic engineering department handling and responsible for traffic results throughout the associated companies.

[fol. 8108] Q. Are you familiar with the operating methods and types of equipment in use by the Ohio Bell Telephone Company in so far as those methods and equipment affect what are known as operators' loads?

A. I am. In the course of my work, I have visited a considerable number of the exchanges and many of the offices in the Ohio Company's territory and have in certain cases made rather extensive studies of some of the problems that are handled in the sections in which I have worked in these Ohio Company's offices.

Q. What do you mean by the terms, "traffic" and "traffic engineering" as applied to your business?

A. In Mr. Rhodes' testimony he referred to a great many of the elements making up the telephone plant, and for the convenience of operation, the telephone work is divided into various functions, plant, being one of the main functions, and the traffic work being another of the main functions. Traffic in the telephone system might be considered somewhat as the passenger traffic on a railroad, being the carry-

ing of passengers, or the freight traffic, the carrying of freight. Traffic in the telephone world is the actual handling of the telephone calls.

Q. And the carrying of the messages by means of wires?

A. The traffic engineering work consists in the specifying of proper types and quantities and arrangements of telephone equipment, not only the switchboards on which the calls are actually handled by operators, but the connecting trunks, which term we apply to the wires between [fol. 8109] local offices, and the toll circuits, which are the trunks connecting different cities or exchanges.

Q. Does the work of the engineers of the American Company cover traffic problems of different kinds which have to be met by the traffic engineers in the associated companies?

A. It does. The engineers of the general force work on the development of telephone equipments, on the development of methods of handling all of the classes of telephone calls in the most effect and economical way, considering first the actual needs and demands of the public and together with that the best methods for handling the calls in the most economical way and rendering this service which is being supplied. All the conditions under which the service is being given and the results which are being attained by the various companies are carefully studied, and the ideas developed,—The idea of producing any improvement in methods or to meet changed conditions and making any suggestions which it is thought from study of the conditions might improve the results. In addition to issuing various circulars, to the associated companies, which are considered to be helpful in the carrying on of their traffic work, the functions of our central engineering force also consist in helping the associated companies to overcome any problems of a special nature which confront them at various times.

Q. Do the traffic engineers of the General Staff work exclusively on problems for the associated companies?

A. The traffic engineering force works exclusively on [fol. 8110] development work which will be of assistance to the associated companies, and on the assisting of the associated companies and the Long Lines Department of the American Company, which department as far as our engi-

neering work is concerned is handled exactly the same as though it was an additional associated company.

Q. Does the Long Lines Department of the American Company have its own traffic engineers?

A. It does. It has a force of traffic engineers who are responsible for carrying on the field traffic engineering work in connection with the specifying of equipment necessary in the operation of the offices operated by the Long Lines Department.

Q. Do the associated companies of which the Ohio Bell is one have their own traffic engineers?

A. Yes, all of the associated companies, including the Ohio Bell, have a force of traffic engineers who are responsible for the field traffic engineering work in their respective territories, the necessary study and specifying of the types and quantities and arrangement of equipment to handle traffic in the offices in their territory.

Q. Is there any arrangement whereby duplication of work on the part of these engineers of the General Staff and the engineers of the associated companies is prevented?

A. The arrangement of the work in traffic is set up along this line. The engineers of the General Staff in New York are continually involved in making what might be termed basic studies, studies to determine whether some proposed [fol. 8111] new type of telephone switchboard or some proposed new method will be an improvement over present conditions, a constant study of switchboard development and method development to meet changing conditions, to supply the necessary information for field engineering, where new problems are coming up. The engineering of the associated companies, as the Ohio Bell, spend their time on the other hand in the actual field engineering. They have the instructions and results of studies covering all conditions which are of a continuous or periodic nature available, so that they can use this data as a basis for their field engineering.

This arrangement of the work is advisable for the reason that actual field engineering is of so pressing a nature that it makes development work and studies on the part of the man who is responsible for the field engineering rather difficult. The specific job crowds him to the point where he has rather limited time for studies and anything of the combination of actual engineering in field work with development

work generally result in old methods staying in effect longer than they should. It has a tendency to keep from progressing and improving the routine. So that on the basis of these conditions it has been found advisable to separate this work.

There is a further benefit from this separation, that development work of the nature we do can be done to a large extent at one time and made serviceable to all of the companies. The work of the same nature could undoubtably [fol. 8112] be done in the individual companies by the provision of additional engineers, who were set aside to work on that problem. Anything of that kind would mean a great duplication and waste, because the engineers would undoubtedly in different companies be working on parallel lines and doing work which can be better done at one centralized point, and then the results placed at the disposal of all the field engineers.

Q. What are some of the principal problems handled by the engineers of the General Staff?

A. The traffic engineering force of the General Staff is divided into four subdivisions, and I think I can probably give a brief idea of the general functions by outlining just briefly what each department does. One of these sub-departments is the local traffic engineering department. This department is responsible for the specifying of the types and quantities and arrangement of equipment which will best meet the problems confronted in giving local exchange service. It also works on the development of operating methods which are necessary in the giving of local exchange, and further provided definite operating practices which will be of use to the actual operating people in the local offices.

A second division of the general engineering force is devoted to toll traffic engineering. Similar to the local traffic engineering division, this department is responsible for studies in connection with the provision of toll switchboards and the studies of toll operating methods to meet [fol. 8113] the changing conditions under which toll business is handled. Further in a similar way *to* the local engineering force provides detailed operating practices in the toll offices so that the actual operation of the toll offices can be carried on in the most uniform and economical manner.

A third branch of the general engineering force devotes

its attention to the study of traffic results. This force studies and provides routine inspections for many of the problems which confront the actual management of telephone offices, the development of uniform records, so that the offices will know what are the necessary and best records to keep in the administration of those offices.

A fourth branch, and the last of the divisions of the traffic engineering is devoting its attention to special traffic matters, including the development of toll fundamental plan studies and including the development of methods for toll rate quoting and toll rate computing on the part of the toll operating forces throughout the country.

And thereupon a recess was had until 1:30 o'clock P. M. of same day (Wednesday, February 27th, 1924).

[fol. 8114] Wednesday Afternoon Session

February 27, 1924.

And also ARCHIBALD J. ALLEN, resuming the stand for purposes of examination in chief, continued his testimony as follows:

Examined by Mr. Burr:

Q. At the close of the morning session, you were stating some of the principal problems, Mr. Allen, met by the engineers of the General Staff and I think you have covered the four general groups. Are there any further groups or had you finished your answer?

A. I had finished. That covers the general outline of the set up in the general traffic engineering department.

Q. Will you please state some of the particular features bearing on the development of telephone switchboards and other central office equipment?

A. I have here some photographs of some types of switchboards which have been developed by the General Staff, and they are in general use throughout the Bell System. I would like to show a few of these photogrpahs and explain from those photographs some general ideas of the traffic work as a basis for certain development of switchboard data which I will give just a little later. I was not quite as liberal with these photographs as Mr. Rhodes. In some cases I have not more than a half a dozen copies, so that you

[fol. 8115] will probably have to pass them around a little bit if everybody wants to see them. This first exhibit is the front view of an A switchboard, which is known in our work as a number one common battery relay switchboard.

Mr. Burr: It may be marked for identification as Allen Exhibit Number 1, and is offered in evidence.

And thereupon the photograph above referred to was marked for the purposes of identification and was offered and admitted in evidence on behalf of the Ohio Bell Telephone Company, and is herewith submitted, marked Allen Exhibit Number 1, and made a part hereof.

Q. Explain the photograph Allen Exhibit Number One if you please?

A. This photograph shows a number of positions of a typical switchboard of the kind which is in use in cities such as Columbus and many of the other larger cities in Ohio. At the top of the switchboard are shown some numbers and these numbers are indicated a position at which an operator is seated. This board, looking at it near the bottom, has a shelf which is known as the switchboard key shelf, possibly somewhat as the shelf on a piano. The board in general set-up is somewhat the shape of an upright piano. This key shelf—On it you will notice various equipment. Towards the front of the key shelf are keys, which are used for ringing, and back of those, keys which are used for listening, and close towards the back of the key shelf are some [fol. 8116] plugs. Those are plugs which are the ends of cords which are used by the operator in putting up connections. One the face of the switchboard near the bottom are rows of white dots, ten in a row. Those represent the lamps which light when a subscriber removes the receiver from the hook. Just above each of those lamps, which is shown as a little black dot, is a cjeck into which the operator inserts one of the plugs of that row on her position in answering a subscriber. If that call then—She answers and gets the call from the subscriber—Is to her own office, she would take the mate to the cord on which she had answered that and locate in the upper part of the face of this board the called number. That part of the board is what is known as the subscriber's multiple and consists of a number of banks of 100 jacks. You will notice on the upright strips, which are known as style strips, some white dots, and on those

are the numbers, indicating the number of the particular hundred.

Looking at the face of this board just to the left of Number 20 you will notice a white line on one of the upright strips and the same white line just to the right of the Number 27. The space between there, consisting of eight strips of these hundreds of jacks, constitute what is known as a section of this board, and an operator sitting for example at position 28 and getting a call would either find the called number in the multiple in front of her or in position 29 to the left or position 27 to the right. For that reason an oper- [fol. 8117] ator getting a call in her own office, as for instance, in Columbus, a main to main call, would reach the called number either on the position, immediately in front or to the right or left.

Just below this multiple are what look like white strips, and under those are also a series of jacks, and that part of the board just above the white dots at the bottom where the subscribers' line signals come in, is what is known as the out trunk multiple. If the operator on answering the call would get a call for an office other than her own, as in Columbus, an operator getting in Main- a call for Franklin or some of the other offices, has to go in on a call circuit button. Those are the little white spots just as the left of each set of keys. The operator selects a button there which has initials on it indicating the office called and by pressing that button, is put in touch with the head-set of the operator in the distant office. That distant office assigns a number which corresponds to that on the out trunk multiple, that is the number jnst above the answering jacks. This number is taken up by the A operator by taking a corresponding pair of her cord and plugging in on that jack.

At this point I want to give you another exhibit showing the face and key shelf of what is known as a B board. This is the board that will be used by the operator in say Franklin on a call coming from the same office.

Mr. Burr: The photograph of the B board may be marked for identification Allen Exhibit Number 2, and is offered [fol. 8118] in evidence.

And thereupon the photograph above referred to was marked for the purposes of identification and was offered and admitted in evidence on behalf of the Ohio Bell Tele-

phone Company, and is herewith submitted, marked Allen Exhibit Number 2, and made a part hereof.

Q. Proceed?

A. This B board is a fairly simple arrangement, the number at the top again indicating the numbers of positions at which operators are seated. The operator of this board has ordinarily no contact with the subscribers. There is nothing similar to the answering jacks or any of that apparatus that is shown on the preceding exhibit. In this case the operators seated at a position, as position 12, receive their instructions over the call circuit from the A operator in the originating office, the A operator merely giving this operator the name of the office in which she is located and the desired number in this office. The operator in this office, who is termed the B operator, corresponding to the title of this board as a B board, assigns or tells the operator at the A board what trunk should be used in completing the call. This trunk, which appears as a jack in the A board, appears on this board as a single ended cord. The B operator having assigned a trunk, picks up a cord of the number which he has assigned and then in a multiple similar to the multiple which we have just seen on the A board locates the desired number. You will notice that again on [fol. 8119] this board we have the multiple in banks of 100, and the operator on this board takes up the plug and locates the number and plugs into the jack corresponding with the subscriber's number.

Q. Mr. Allen, in order to illustrate a given call and to put the illustration in my own language, will you tell me if my understanding of the switchboard situation is correct? Let us take, for example, an operator sitting in front of the Number 28 on your Exhibit Number 1. In the panel, the upright panel in front of her, commencing at the bottom, are six rows of white dots?

A. Yes, sir.

Q. Now if a subscriber, whose number is represented by one of those dots, desires to call another subscriber, as I understand it, when the calling subscriber removes the hook, that shows a light corresponding to his number in that panel?

A. The little lamp immediately lights, showing that there is someone wanting the attention of the operator.

Q. Now up to that time there is no talking connection with

anybody, simply the fact that the calling subscriber has removed the receiver from the hook has caused that lamp to light and show the operator that the calling subscriber needs attention?

A. Yes, sir, that is correct.

Q. Then the operator, in order to put herself into connection with the calling subscriber, takes one of the plugs which are standing up in rows and to which are attached cords and plugs into the jack or hole immediately adjacent to that [fol. 8120] subscriber's line lamp?

A. Yes, sir.

Q. Then that puts the operator and subscriber in communication with each other and the operator asks the subscriber for the number which the subscriber desires?

A. Yes, sir.

Q. If the subscriber is what we will call a main subscriber, that is to say, one directly connected with the main exchange, and if he desires a main number, that is, the number of another telephone terminating directly in the main exchange, the operator as I understand it picks up the corresponding plug to the one already plugged into the calling subscriber's jack and plugs into the multiple jack bearing the number of the called subscriber?

A. That is correct.

Q. And thereupon rings the called subscriber?

A. Yes.

Q. That is the way in which connection is made through this board between two subscribers whose telephones terminate directly in the same exchange.

A. And that is about the simplest type of telephone call we have to deal with. There are many variations of that. The operator may on going up the multiple find one of those little white spots or black spots in the multiple as you see on Exhibit Number 2; it may mean that the calling subscriber has a number of someone whose service has been discontinued or maybe away from the city or moved to some other zone. There are some complications of that kind. But the simplest call is the one which you have outlined.

[fol. 8121] Q. Those little white spots in the subscriber's multiple which you see indiscriminately like a lot of stars on a very clear night, represent some legend which tells a story about the telephone or the subscriber whose jack bears that spot?

A. Yes, or the number corresponding to that spot. It may be that the subscriber, as I say, has moved to some other part of the city and various things of that kind. That is denoted. There are various types of plugs. The white plug shows up more clearly in the picture. There are red and black plugs, indicating various conditions with that line.

Q. Let us go back to the main subscriber again and assume that that subscriber desires to talk with a subscriber whose telephone terminates in some other than the main board, for example, let us say Franklin. The Main subscriber, who is the calling subscriber, removes the receiver from the hook, the corresponding lamp lights in front of the operator, and the operator as heretofore—And I am talking about the operator at the Main exchange now—Plugs in and makes the connection between herself and that calling subscriber, and thereupon asks for the number as heretofore?

A. Yes, sir.

Q. When the subscriber asks for a Franklin number instead of the Main number, then if I understand you, it is necessary that in some way or another the Main exchange and the Franklin exchange be connected so that the subscriber's message may pass from the Main exchange to the Franklin exchange and from the Franklin exchange out [fol. 8122] over the wires of the Franklin called subscriber?

A. Yes, sir.

Q. Therefore the operator, instead of taking the corresponding plug and plugging into the jack in the panel in front of her, presses a call button?

A. Yes.

Q. And that puts her into immediate communication with the Franklin operator?

A. It connects her directly to the head set of the Franklin operator.

Q. And the Main operator then tells the Franklin operator the number of the called subscriber with whom the Franklin operator is desired to make the connection?

A. That is right.

Q. The Main operator, however, does not say to the Franklin operator, "Franklin such and such a number", but says, "Main such and such a number".

A. Yes, she does that to identify herself, because in many cases we have more than one office terminating on the same B operator and the B operator has to have something to show her where the call is coming from so that she can assign a trunk to the proper office.

Q. That is to say, the Franklin operator by being given a number connected with the Franklin Exchange which the calling subscriber desires and having had that number prefixed by the main operator with the word "main" knows by that that someone connected with the main exchange is desiring to call for a Franklin subscriber?

A. That is right.

Q. Therefore the Franklin operator knows that she must [fol. 8123] select a trunk which will connect the Main and the Franklin exchanges?

A. Yes, sir.

Q. As soon as the Franklin operator gets the call from the Main operator, if I understand it, she does what is called assigning a trunk, and gives to the Main operator a number?

A. Corresponding to the number of the trunk on which the call is to be completed.

Q. And that means that that is the trunk in use between the two exchanges, Main and Franklin, over which the call is to be completed, that that is to be the connecting link between the two subscribers?

A. Yes.

Q. And the Franklin operator must tell the Main operator the number of the trunk, because there are a great many trunks between the offices and any trunk won't do because one or more of them may be in service at the same time?

A. That is right.

Q. The Main operator then having told what trunk is to be used in making the connection, she takes the corresponding plug that we have been talking about and instead of plugging into a subscriber's multiple in front of her, plugs into the proper jack or the jack corresponding to the selected trunk, is that right?

A. The jack corresponding to the number which has been assigned to her by the B operator.

Q. Yes, and that connects the calling subscriber then with the Franklin exchange doesn't it and the Franklin operator, who is sitting at a B board, in the meantime has connected the selected trunk with the called subscriber's number?

[fol. 8124] A. She proceeds as soon as she assigns the number—She proceeds to take the cord corresponding to the number of the trunk she is assigned and makes the selection in the board. Sometimes the A operator will screw the plug into her trunk before the B operator has reached and plugged into the number, and at other times the B operator will beat the A operator and then she waits.

Mr. Kinnison: What is the purpose of all of this?

Mr. Burr: Because I have found in almost every case in which I have participated that there has been a great deal of interest showing exactly the method of making a telephone connection, and I have considered that this commission so far as I know have never heard this testimony and would be interested in it.

Mr. Kinnison: It is interesting, but I do not see how it affects the case.

Mr. Burr: The connection is practically made, so if you will bear with me a moment, I will be through.

Q. Now the connection having been thus established through from the Main calling subscriber to the Franklin called subscriber, the Main operator pushes the button which rings the bell in the called subscriber's premises?

A. No, in this particular case in the majority of the B boards the arrangement is such that the ringing starts automatically, and it is so arranged that the ringing does not start unless the B operator has plugged into the jack of the called party and the main operator has plugged into the [fol. 8125] jack of the Main office, thus avoiding instances where the operator finds she has a w-ong number or something of that kind. It avoids calling the party to the phone.

Q. That is the case here because in this particular board the ringing is automatic?

A. Yes, and if it were not automatic the B operator would do the ringing by pressing a proper key.

Without any particular further description I have one other exhibit here showing an A board with the operator actually working at the board and the various desks where people necessary to handle the office, such as chief operator, clerks and so forth are seated, and also showing the supervisors on the floor, which gives a very definite picture of the conditions in the central office, giving an idea of the size of a fairly typical unit.

Mr. Burr: It may be marked Allen Exhibit Number 3 and offered in evidence.

And thereupon the photograph above referred to was marked for the purposes of identification and was offered and admitted in evidence on behalf of the Ohio Bell Telephone Company, and is herewith submitted, marked Allen's Exhibit Number 3, and made a part hereof.

The Witness: These switchboards which I have shown you are the result of a continuous development over the years since the telephone was first put into commercial use. [fol. 8126] Nearly all parts of this board have been improved since this type of board was first placed in service. The cords for example which are shown on the key shelf have been improved. On the first boards of this type a cord with a steel core was used in order to have sufficient strength to stand the operations. The switchboard development people, working on this matter, experimental over a considerable period and developed a type of tinsel which was strong enough to serve the purposes required in the cord, and this from a traffic point of view was of very great value. In handling calls similar to the call which we have described here, even on this simplest type of call, going from the calling party to a called party in the same office, the operator spends about a third of her time in actually handling those cords, picking them up, making the connection and bringing them down, and the improved cords have made it possible to put up and take down a connection in one second less work per call than was necessary under the old style type of cords. You get an idea of the improvement or savings of that kind when you realize that our expense for operators' wages per year in the Bell system runs at the present time about $140,000,000.00, so that a saving of one second per call enabled us to have operators handle a correspondingly larger number of calls, and amount to very large proportions in a case of this kind by the saving of one second for handling a pair of cords, which is equal to about $7,000,000.00 per year in the expense of operators' [fol. 8127] wages in the associated companies.

Decided improvements have been made in the keys. In the early type of switchboards practically all of the ringing keys were on a push button type. Where there is any considerable amount of ringing, we have changed to improved keys that indicate when the key is in a ringing position,

indicate on party lines what party has been rung. This has made it possible to increase the number of calls which the operators handle.

Mr. Shuler: When were these two improvements made?

The Witness: They have been made over various periods. The first tinsel cords were put in about 1912. We have since improved those and put in still better types of cords. But they are not improvements which are made today and dropped there. They are a continuous study.

Mr. Shuler: I just asked you when they were made?

The Witness: Slight improvements are made from time to time. The supervisory signals. In connection with each pair of cords, there are two signals which shows the condition of the call. Those signals due to improved relays, have been greatly improved, so that the operator relays, have been greatly improved, so that the operator can depend on the signals and in that way improvements have been made in the loads that the operators can carry. One decided improvement was the introduction of machine ringing in B boards. That saves not only the individual operator's time on the first ring but saves it on subsequent rings. [fol. 8128] At the present time on the volume of traffic handled in the Bell system that saving amounts to about three and a half million dollars.

Q. That is a year?

A. Per year, due to the increased loads.

Mr. Shuler: When was this improvement made?

The Witness: About 1910, the first adaptation of that. Since that time we have improved that and made it adaptable to a great many more boards.

Mr. Shuler: Who were responsible——

Mr. Burr: Let the witness finish.

Mr. Shuler: I just asked him when it was made.

Mr. Burr: He was going on to say that since that time——

The Witness: Since that time the original use of that machine ringing on B boards has been greatly extended by developing arrangements to use it on boards having party line ringing and various conditions of that kind.

Q. Has any of that development occurred in the year 1923?

A. I don't think any bulletin has been issued on it.

Q. How much work have you done there?

A. There has been work done on it and additional boards converted to that method of ringing in 1923 in various cities throughout the country.

Mr. Shuler: You know who made that typical improvement originally? Wasn't it made by the independents [fol. 8129] originally?

The Witness: Not from my understanding.

Mr. Shuler: You don't know.

The Witness: I know that the original patents in connection with the machine ringing were taken out by the associated American Companies, not by the Independents, yes, sir. Another example of an improvement in equipment which has resulted not only in the decided improvement in expenses but also on the service which is given to the public has been the multicoin prepayment box at subscribers' stations. Under the old type of pay stations it was necessary for the operator to remain on a connection until the called party had answered and then get the calling party and have him deposit a coin. There were further delays often times by the fact that the calling party did not have the right change and had to go and get it and things of that kind caused delay to both the calling and the called subscriber and added work on the part of the operator. There are upward of two million calls a day handled at the present time from prepayment coin boxes, and in addition to the improved service to both the calling and the called subscriber, that means a saving in the work time of the operator which is equal to a million and a half dollars a year in the associated companies.

Q. In the first part of your answer you referred to subscribers' stations. You meant did you not pay stations?

A. Yes, I meant pay stations. We are inclined to use the word subscribers for anybody who is using one of our tele- [fol. 8130] phones, but I meant to refer to pay stations.

Q. Have you any further illustrations?

Mr. Kinnison: Pardon me at this point. May I ask a question or two?

Mr. Burr: Yes.

Mr. Kinnison: You testified by the introduction of this new kind of cord an operator was able to save a second on a call. Can you tell me the time necessary for each of the

elements making up a completed call, the time consumed by the operator in that performance?

A. There are in the neighborhood of—This would be a matter of judgment as to what the different elements of a call are.

Mr. Kinnison: Could you give them, Mr. Allen prior to the introduction of the tinsel cord and then at the present time with the use of the tinsel cord?

The Witness: Yes, the amount of work time on the part of an operator, prior to the introduction of this cord on this simplest type of call which I have outlined was eleven seconds.

Mr. Kinnison: That is within the same exchange.

The Witness: And it is now reduced to ten seconds. As I said about a third of the operator's time or about three and one half seconds, are now used in actually manipulating the cords, putting up the cords and taking them back down, and the rest of the time is used in manipulating the keys and actually talking with the subscriber, the proposition of saying "Number please" and then repeating the number back [fol. 8131] to the subscriber at the end of his giving the number, so that the total time of that call in that exchange as——

Mr. Kinnison: What part of the eleven seconds is taken up with the manipulation of keys?

The Witness: It just depends—It would depend somewhat on the type of board that you are talking about. There are a good many on this Number One board——

Mr. Kinnison: You started out to tell us about the A board.

The Witness: Well, it would be about a second and a half, that is, operating the key in connection with opening it to talk with the subscriber and assuming that the operator rings on that key after she had plugged in the subscriber's multiple.

Mr. Kinnison: Is that the same at the present time as it was prior to the introduction of the tinsel cord?

The Witness: We cannot measure those things when they get small fractions of seconds. It is not generally done that way. There is no object in dividing up the calls in establishing our operating methods and so on in that way. We do not find occasion to go to a proposition of timing the possible 12 or 15 elements that go to make up a call. It

would be more or less futile, because we have many overlapping propositions. We are constantly studying the proposition of so training our operators that they can do these things as an overlap proposition while they are doing the others.

[fol. 8132] Mr. Kinnison: As a general proposition you cannot tell the time necessary for an operator to perform any of *of* these functions necessary in the completion of a call.

The Witness: We are called from time to time to make studies of that kind, but it is our normal way. In the introduction of some new type of equipment we do under those conditions make detailed studies from the work of the individual calls; we do take time to study that individual operation; but it is not part of our regular routine.

Q. Why would overlap complicate the time of the individual elements going to make up the total time consumed by the operator?

A. In this particular instance as to which I have been asked the amount of time in operating a listening key, we find for instance on answering a call when the line shows light on her switchboard, she immediately reaches for the cord. With the other hand she -*knows* the key off. It is considerably a matter of judgment there, whether you are going to say that the operator spent a half second opening up the key while as a matter of fact she was using the other hand to pickup the plug. Is half of it chargeable to the key and half of it to the picking up of the plug?

Mr. Kinnison: How can you say so definitely that there is one second's time saved, because of the new type of cord?

The Witness: Because we have a large amount of ob-[fol. 8133] servations on which we have found the total amount of time that takes an operator to handle a certain number of calls before and after the introduction of the new cords. We make these in various ways. One is by the use of a cumulative stop watch, where we would get the total time it took an operator to handle these 100 calls. We are doing this all the time where we have a proposed new type of equipment. With a certain number of average experienced operators, we get the total amount of time that they take in handling a hundred calls under the existing equipment. Then we change over and after giving the

operators sufficient training to make them proficient on the new type of equipment or with the new method, we can time these same operators under similar conditions and get the total time it takes to handle a call. That is to my mind the fairest way to get an answer of that kind, because in that way you have found how the new feature fits into the total proposition of handling a call. Often times we do have suggestions of improvements in method and improvement in equipment which in itself might look like an improvement on a certain call, and yet you might make a number of calls and in that way find the net result on a hundred calls might be to take longer to do it, although one individual operator might be short. So you must look at the thing from the broad overall point of view to make sure you are not deceiving yourself on some item of handling a call.

Mr. Kinnison: Who makes this equipment, the one you [fol. 8134] spoke of?

The Witness: I assume the Western Electric. They make all of our equipment, which they sell to the subsidiary companies. They will supply it to the new switchboards and to the cases where they have worn out.

Mr. Kinnison: Do they sell it at cost?

The Witness: I assume they sell it at a fair profit under the contracts they have with the companies.

Mr. Kinnison: You are citing it are you not as an achievement under the four and a half per cent contract.

The Witness: Yes, you may call it that.

Mr. Kinnison: You are asking the telephone companies to pay you for the research work which resulted in the development of that as well as in the manufacture of it.

The Witness: I am simply giving that as an instance of an improvement which has resulted in a large saving in the work of the traffic department. That is the saving which I talked about. The saving is in the traffic expenses of the associated companies.

By Mr. Burr:

Q. Now all these things you have been talking about, the investigations that you have been making, the tests that you have been conducting in order to determine whether a given kind of apparatus or a given suggestion is advantageous to associated companies is part of the work which your department does under the license contract is it not?

A. Yes, sir. As I understand it, there is no other charge

[fol. 8135] for this work except that which is paid for under the license contract.

Q. Is it part of the duties of your department to continuously investigate these matters in order that you can make recommendations on the subject to the associated companies.

A. It is. We are continually making studies of conditions under new types of boards or new methods of operating, to see whether they would be of advantage.

Q. Are you familiar with the type of switchboard used in LaCrosse, Wisconsin?

A. I am. I have conducted studies on boards having operating features similar to the board at LaCrosse, Wisconsin, both in boards having all of the features from an operating standpoint which are in use and many boards having different combinations of those features. I have also observed the operation of the board in LaCrosse, although I have not made an extensive study there to determine the operating features that were in use on that board.

Q. Are the associated companies, including the Ohio Bell Telephone Company, receiving the benefit of these changes you say you have made?

A. They are. We have in various correspondence with different associated companies advised them as to the various features that are of value to the company under various conditions, and the associated companies are to a large extent using these facts where they prove to be of assistance in giving service.

Mr. Kinnison: How long does it take to complete a con-
[fol. 8136] nection where the calling and called subscribers are on different exchanges.

The Witness: That runs about 15 seconds. I am referring to the work of the operator in completing such a call.

Mr. Kinnison: In a town where traffic could be handled on one exchange, one exchange would give more satisfactory service to the subscribers then two exchanges in that town.

The Witness: I do not think that anything but perfectly satisfactory service would be given in either of those conditions. The length of time to get the called party would be slightly longer on the two stations.

Mr. Kinnison: There would be a saving in personnel of the employees?

The Witness: Yes, sir, there would be a saving in the number of operators used.

Q. Do you know of any board in the United States which comprises all of the features of the LaCrosse board?

A. The LaCrosse board—Speaking of the features, I am mentioning them from a traffic man's point of view. As far as the actual operation is concerned there are other boards where we could take an operator that has been trained to use them and set her down at the LaCrosse board and she would not know there was any difference. The only thing about the LaCrosse board that is different from any other board I have seen is the method used to get the calls to the operator. Instead of the subscriber's line going directly [fol. 8137] to an answering jack on a switchboard it goes through a set of switches and it appears to the operator on a line signal and she plugs in on a line jack exactly the same as on other boards, so that that feature of the switchboard in the LaCrosse board from an operating view point does not present any differences.

Q. That is what is referred to as the mechanical distribution of calls is it not?

A. Yes, sir.

Q. Do you know of any other board in the United States that has that feature?

A. Yes, we have a board in Wilmington which we installed in 1916 which has complete mechanical distribution of calls, and on that board we made extensive studies with the idea of determining whether the features which can be brought about by the distribution were of sufficient value to pay for the additional equipment.

Mr. Kinnison: If I understand you correctly on all of these mechanical improvements which go to improve the art of telephony, they are sold to the associated companies at a profit are they?

The Witness: Well, I have no definite understanding to the contrary. I assume that the Western Electric Company is running as a business institution and selling its equipment at a sufficient profit to keep in business. That is absolutely my understanding, yes, sir.

Mr. Dotson: Have you concluded your study of the Lacrosse board and board in Delaware that you have mentioned?

[fol. 8138] The Witness: No, I would not say that we had. We have recommended the use of certain of those features and are using them from time to time, continuing to study those boards with this view. If we can accomplish some

of those features by improved equipment which does not cost as much as those boards have, then we will be able to use still more of those features and more of those boards.

Mr. Harshman: What features have you used up to the present time off of that board?

The Witness: We are using the audible ringing signal, the machine ringing on A board; we are using multiple line lamps, using automatic peg counters. We are using practically all of the features on those boards with the exception of what is termed the——

Q. Those are features on the Wilmington, Delaware board which you are recommending to other boards, is that the id-ea?

A. Under conditions where they prove in.

By Mr. Burr:

Q. But only under those conditions?

A. Yes. None of our switchboard developments—Very seldom do we get one where we can say, "This applies on all future boards." We supply the associated companies with circular letters, giving them conditions under which various things will prove valuable to them in their giving of telephone service.

Mr. Harshman: Who developed the LaCrosse board?

The Witness: Why the earliest record we have of the use [fol. 8139] of most of the features that are in use in the LaCrosse board was in installation in Youngstown in this case put in by the American Telephone and Telegraph Company. There is nothing on the LaCrosse board we have not a right to use and have not used since 1910 when the Youngstown board was first equipped with those things.

Mr. Harshman: How long has the LaCrosse board been in existence?

The Witness: The LaCrosse board was cut into service in the middle of 1921—Along about June of 1922 the LaCrosse board was put in service.

Mr. Harshman: Was it then you commenced that systematic study or did that study start in Youngstown.

The Witness: No, we started that study in the Youngstown board in 1910 and the Wilmington board was put into use in 1916.

Mr. Shuler: Isn't it a fact that the LaCrosse board cannot be built by any one person complete.

The Witness: Absolutely not. The Western Electric Company could build that board with all of the features.

Mr. Shuler: You own it or control it?

The Witness: Yes, sir, we can use all of the features of the LaCrosse board. There is nothing novel about the Lacrosse board.

By Mr. Burr:

Q. So as to clear the record, Mr. Allen, the LaCrosse board, so called, is not manufactured by the Western Electric Company?

[fol. 8140] Mr. Harshman: He has said so.

Mr. Burr: He did not.

The Witness: The original LaCrosse board was installed a great many years ago by the Kellogg Manufacturing Company and it has been modified from time to time, and the 1922 change was a change in getting the calls to the LaCrosse board. There was very little change made. These switches were introduced as a distributing scheme in 1922. Previous to that the LaCrosse board for a number of years had practically all of the features that are on it.

Q. But the board at LaCrosse is not a board made by the Western Electric Company?

A. The original board was installed by the Kellogg and they have put on all the changes.

Mr. Shuler: You do not want the inference that the LaCrosse board is a result of the work of the General Staff.

Mr. Burr: He did not say so.

Mr. Shuler: He said absolutely that.

Mr. Dotson: I submit I got it that way.

Mr. Burr: The gentleman in the Dayton case I know are quite sure of that. They have been drumming away on the opposite of that.

Mr. Shuler: You have been asking this witness what the General Staff has done for telephone companies. You called attention to the LaCrosse board, and I put no other inference on it.

[fol. 8141] Mr. Burr: He has been telling you over and over again that the features of the LaCrosse board are something which the General Staff have had under investigation and development for many, many years, commencing with 1910. I am sorry this misunderstanding occurred——

Mr. Dotson: Just a moment——

Mr. Burr: Because we had no intention of intimating that the LaCrosse board was engineered by the General Staff or manufactured by the Western Electric Company.

Mr. Dotson: I think that the record at the present time would lead a disintere-ted person to believe that the board in Youngstown, which seems to be the basis of the board in LaCrosse, was developed by the General Staff.

Mr. Burr: Nobody has said or suggested that the Youngstown board was made the basis for the LaCrosse board.

Mr. Dotson: What connection had the Youngstown board with the LaCrosse board if any?

The Witness: The Youngstown board had many of the operating features that are used on the LaCrosse switchboard.

Mr. Burr: Mr. Dotson, may I explain this to you?

Mr. Dotson: Certainly if you wish.

Mr. Burr: This testimony as you will remember perhaps has been stipulated into the Dayton case.

Mr. Dotson: Well, I don't know.

[fol. 8142] Mr. Burr: I think if you don't know it is because you do not believe me or did not hear my opening statement.

Mr. Dotson: I don't remember them. I will put it that way.

Mr. Burr: In that case the LaCrosse board, so called has been argued as something the Bell system did not have and as something better than anything which the Bell system has, and it is responsive to testimony of that kind that I asked Mr. Allen in passing something about that board. I am sorry I did not explain that for the benefit of Mr. Shuler and the gentleman from Canton, because they had gotten the wrong impression. What I am trying to do here is exactly the opposite of what they accuse me of doing.

Mr. Dotson: Your explanation is of direct value to me.

Mr. Burr: It is a little difficult when we have so many cases going at once to differentiate between the different cases and counsel in the different cases.

Mr. Kinnison: Did I understand you to say in response to Mr. Shuler that the Western Electric could make the LaCrosse board with absolute freedom?

The Witness: Yes, sir.

Mr. Kinnison: Patent rights expired.

The Witness: There are no patent rights involved in it except patents which we have in our files, which Mr. Rhodes presented to us the other day.

[fol. 8143] Mr. Kinnison: You acquired them since the development of it?

The Witness: Oh, there is nothing patented in connection with anything that has happened lately.

Mr. Kinnison: I am speaking of the LaCrosse board as a board. I don't know anything about the patents involved. You are free to manufacture it are you?

The Witness: Yes, sir.

Mr. Kinnison: You did that by acquiring the patents of the automatic electric company of Chicago?

The Witness: No, there is nothing in connection with the LaCrosse board that was made by the Automatic Electric Company in Chicago.

Mr. Kinnison: Do I understand you to mean that there were no patents on it.

The Witness: No patents; no I have just stated there is nothing new in connection with the LaCrosse board. It is simply a combination of features which we have been using in various places since 1910 and in different places before that.

Mr. Kinnison: There is nothing subject to patent protection?

The Witness: There is nothing but what we are free to manufacture. There may be some patents in connection with the board, but there is nothing in the LaCrosse board but what we are free to manufacture and use where it proves *in as* efficient.

By Mr. Burr:

Q. What has been the general effect on the investment [fol. 8144] and operating expenses of the associated companies based upon the changes in switchboard design and switchboard development which you have been describing?

A. Many of these features which we work on from day to day in connection with switchboard development, are not susceptible of definite evaluation. I have gone over a number of the features such as those I have mentioned here, and the ones which I have mentioned, and which I

have given a value to result in a saving of over $16,000,000 a year to the Bell system over the previous boards.

Q. In speaking of the Bell system you are referring to the associated companies?

A. To the associated companies.

Q. How are the associated companies informed of the improvements in switchboards and other equipment and methods also which are developed from time to time by the American Company?

A. The engineers of the various associated companies such as the Ohio Company, are in almost daily, if not daily communication with the engineers of the General Staff by telephone. A continuous volume of correspondence is going on between the Staff engineers and the associated company engineers, and there are very often questions which need to be discussed and talked over to get at the basic facts. In those cases, engineers from the associated companies come to New York and work with the engineers of the General Staff. In many other cases it is more advantageous to get at the problem right in the field, and in those cases our engineers go to the city where the [fol. 8145] question is involved and work with the associated engineers in working out a satisfactory solution to the problem in question. On the large projects of switchboard development and operating methods, after our studies are completed, on any subject, circular letters are issued, which are sent out to all of the associated companies to be used by them as a basis for their field engineering.

Q. I have with me a set of general engineering circular Number 1,200, which is a typical circular, showing the date it is sent out, showing how central office equipment, both local and toll, is engineered. This has sometimes been referred to as a traffic engineer's Bible. It is the basis data for engineering switchboards.

Q. Is that so-called circular subject to revision from time to time?

A. It is. It is under fairly constant revision. The circulars are nearly all of them sent out in loose leaf form, with the idea that there will from time to time be either additions or alterations, and at such times new pages are printed, and at such times as material revisions are brought about, a new circular is issued. I will be glad to

get additional copies of this if anyone should want them. I did not assume that they would be of any practical value after this is over, unless they want to engineer a switchboard.

Mr. Kinnison: They might be before this is over.

Q. I note that the date on the circular is October, 1922. [fol. 8146] What work has been done on it since that time if you know?

A. I do not know of any revisions that have been sent out on this since that time.

Q. Well, I was not thinking so much of revisions as I was of practices covered by the circular. Are they subject——

A. The work is continually going on. The engineers who are responsible for that work are continually employed on studies and render assistance to the associated companies both in putting this circular into effect and interpreting it and solving any specific problem- that are not covered in this circular. This circular by the way gives the general instructions. Now there are a large volume of circulars, as for instance, on a number O type of switchboard, which is just one type of a common battery board, there is a circular about as large as this that gives the details of engineering one of those boards. This circular would lead you to the point where you would find out whether you were going to put in in that particular city, based on basic data as to calls and so forth—Whether you wanted a number nine or a number 1-C board. At that point, you would find a circular such as would apply to one of those boards, such as say a circular applying to a number 9 switchboard.

Mr. Burr: The circular may be marked Allen's Exhibit Number 4 and is offered in evidence.

And thereupon the circular above referred to was marked [fol. 8147] for the purposes of identification and was offered and admitted in evidence on behalf of the Ohio Bell Telephone Company and is herewith submitted marked Allen's Exhibit Number 4 and made a part hereof.

Q. Have you any idea how many days, weeks, months or years it has taken to develop the practices covered by the circular?

A. Why, it is continuous work on the part of several local engineers and several toll engineers who are working continually on the routines in connection with switchboard engineering.

Q. In whose employ are those engineers, local and toll?

A. They are in the employ of the American Telephone and Telegraph Company.

Q. And a part of the General Staff?

A. They are.

Q. I understood you to say there are other circulars which go out to the associated companies, including the Ohio Bell Company. Have you any idea how many of those there are all told?

A. There are several thousand traffic circulars which are issued by the particular department with whic- I am connected. We have issued since 1908 when we started a new series—There have been about 250 of those issued. Of the general engineering projects, covering more general projects, this circular, 1200 were issued in 1922. I think there is somewhere near fourteen or fifteen hundred of those. In addition to that there are commercial and various other [fol. 8148] circulars. So that the total actual circulars sent out are in the thousands.

Q. You speak of these as circulars. In common parlance a circular is usually considered as a comparatively choice general communication on some subject. Do you know how many pages there are in Circular Number 1,200?

A. It is numbered in sections, so that I do not believe it shows the straight numbering through. I do think I remember there are approximately 150 pages.

Mr. Shuler: It wil- show for itself.

Q. And this so-called circular goes into the subject in the greatest detail does it not?

A. Both local and toll traffic engineering is covered in detail; the use of the basic data and the outline of certain of the best forms to use are outlined in that circular.

Q. Are new circuits or types of equipment now being worked on and tested out by the engineers of the General Staff, so that they will be available to the Ohio Company?

A. There are both in the laboratory tests and in actual field trial a number of modifications in switchboards and in circuits, which will be, if successful, and we are at the

point where we think a number of them will be successful, available and of use to the Ohio Company.

Q. Has there been any diminution in the work required of your department in the last few years?

A. There has not. We are having constantly more and more studies and development along that line.

Q. In your judgment then the necessities of the busi-
[fol. 8149] ness requires that?

A. I think that the work is absolutely necessary and we are satisfied that the most efficient way to do it is by a general organization working on that, and it is absolutely essential.

Q. In what other ways in addition to switchboard and development design does the General Staff assist the associated companies?

A. We have expert operating men who are making a continual study of the best methods of operating boards and the study and development of the actual practices which will be used in operating the board after they have been designed. As I said before, the fact that we are spending about $140,000,000.00 a year makes it obvious that there are real economies in studying operating methods and practices, to look for any shorter ways of accomplishing the operations which have to be done.

Mr. Shuler: Who is spending $140,000,000.00 a year?

The Witness: The associated companies of the American Telephone and Telegraph Company for operators' wages.

Mr. Kinnison: Spending what?

The Witness: I said the fact that we have a payroll for operators in the associated companies of practically $140,-000,000.00 a year makes the study of the best methods of handling calls on switchboards a very important work, and this work is constantly being studies. This work involves a considerable amount of field work, as our engineers at certain times in the development of a method, make an ac-
[fol. 8150] tual field trial oftentimes covering months of time, in order to make sure that the new method will give satisfactory service to the public, and sometimes improve the service and in other cases keep the service at the same grade and enable us to make economies in the operation. This work is carried on by engineers in both the local and toll field.

Mr. Dotson: These methods that you have just spoken about being tried out in the field and you keep a man from the General Staff up in the field for the purpose of determining whether or not it will give satisfactory service to the public—Is that experimental study during the experimental stage that that goes on.

The Witness: Yes, we have many of these ideas developed by our own people or by operating men in the associated companies or by people in any line of work that submits an idea. We study that to see whether it has possibilities in it. If it does we make more or less experiments in New York, and if it continues to show prospects, then we will actually install that equipment or put that method in effect in some typical office and keep it in effect there and study the results over long enough a period to find out whether there are real advantages in the proposed change.

Q. Then you do not really make a practical test in the home office or where the General Staff carries on its operations?

A. The American Company operates no local exchanges and our Staff operates no exchanges. We would make a [fol. 8151] toll study either — an associated company's office or in one of our Long Lines department's offices, depending on the type of study. We have no office which we operate ourselves. We use——

Mr. Dotson: Then as a matter of fact, such experiments, if carried on on an extensive scale, will affect the cost of operating your local exchanges will it not?

The Witness: We send our own people out to carry on these studies, and in any case we are making a study of that kind, if there are any expenses to which the local company is put in connection with the study, we reimburse them for that amount, and if we put in any equipment which does not prove to be satisfactory equipment, we either remove it and restore the equipment which was previously there or settle with the associated company by paying for the new equipment which is put in or any part of it so that the associated companies are put to no expense through this work.

Mr. Dotson: What means have you of ascertaining whether the public receives the use of such equipment that you are experimenting on in a favorable way.

The Witness: We have various means of determining that, both by observing on the calls as they are going through

any comments on the part of the public and by interviewing the representative body of subscribers and getting their comments on the new feature, if it is one that is noticeable to them. In many cases our engineers have carried on [fol. 8152] studies where we felt that the best test as to whether the subscribers were approving of the new feature was to actually talk with a considerable number of representative subscribers and get their direct reaction to the change.

Mr. Dotson: Is that the only method which the General Staff has of determining the practicability of equipment tested out in this fashion.

The Witness: I have outlined it. We make laboratory tests and do all of the preliminary work——

Mr. Dotson: I understand that that is not the——

The Witness: I don't know of any other method of finding out how the public like any change in equipment other than to put it in and use it.

Mr. Burr: The field being as broad as it is I think Mr. Dotson ought to specify some particular practice to which his question refers.

Mr. Dotson: I am referring to the practice which he has been describing.

Mr. Burr: I know, but he has been describing very, very many practices.

Mr. Dotson: Not in this particular.

Mr. Burr: Oh, yes, they extent from the action of operators at a board down to the matter of the issuance and execution of circulars.

The Witness: A great many of the experiments which you carry on would not be in any way known to the subscriber. [fol. 8153] For instance, whether we have a steel cord or a tinsel cord, whether we have a plunger type key or lever type key has no direct effect on the subscriber. There are certain types of operation where the subscriber is supposed to depend on it, such as ringing tone and in those the only way I know of to find out is to develop them to the point where the circuit is operating properly and then install them and get the subscribers' reaction as to whether they are satisfactory from their point of view.

Q. Do you know whether the subscribers do depend on that ringing tone now?

A. Yes, we know that the subscribers become familiar with that tone. For instance the original study on that par-

ticular feature was made in Youngstown and we later on continued that to the point where we felt that it had value in multi-office cities. I personally conducted a study in Minneapolis and St. Paul in 1916, and after making studies in the office I interviewed about 400 subscribers in each one of those cities in order to find out the percentage of the subscribers who do become familiar with that tone and whether it was as satisfactory to the subscriber as the previous practice of giving reports on the part of the operator, stating that the called party was being rung, and that I think it fairly typical of the method of carrying out those experiments.

Q. Were those experiments conducted by you while you were a General Staff man?

A. They were.

[fol. 8154] Q. The benefits of that were given to the associated companies?

A. A circular was issued in 1917 outlining an extension of the syste-, to multi-office cities and has since that time been very largely installed——

Q. Including the State of Ohio?

A. Yes, sir.

Q. Have you any circulars on suggestions——

A. I would like to introduce as Exhibits, local operating practice, which is the set of circulars issued as a result of the studies of the local traffic engineering people on local operating practice, and also a copy of the toll operating practice, which has been done by the toll traffic engineers.

Mr. Burr: They may be marked respectively Allen's Exhibit Number 5 and Allen's Exhibit Number 6 and we offer them in evidence.

And thereupon the paper writings above referred to were marked for the purposes of identification and were offered and admitted in evidence on behalf of the Ohio Bell Telephone Company, and are herewith submitted, marked respectively Allen's Exhibit Number 5 and Allen's Exhibit Number 6 and made a part hereof.

Q. Mr. Allen, are there other lines of work undertaken by the General Staff in its traffic engineering department which are also of assistance to the associated companies in operating telephone exchanges?

A. There are a number of other important lines of work which are carried on by the General Staff engineers. One

[fol. 8155] of these lines of work is the study to determine for all of the varying types of switchboards and the varying classes of calls handled in different cities throughout the country the exact number of calls which can be handled per hour by the average operator and maintain a good grade of service. As an example of the importance of this work, if we could arrange so that each telephone operator in the associated companies would handle just one additional call per hour, or eight calls per working day, we would accomplish a saving in the wage account of the Bell system, one million dollars per year, so that it will be seen from that the absolute importance of knowing what the proper operator loads should be. We want these loads high enough to be efficient. We do not want them high enough so that we are burdening our operators or that we are in any way interferring with the possibility of getting a high grade of service. This work has been studied in many cities throughout the country, these studies taking a considerable amount of very technical and carefully thought out methods and taking the time of very well trained experts on such studies. As a result of these studies we have issued to the various associated companies circulars giving them definite instructions as to the possibilities on all the various types of switchboards and on the various classes of calls, such as flat rate calls, message rate registered calls and so forth.

Another line of work which is closely related to the prob-
[fol. 8156] lem of operators loads is the maintaining of necessary records of the work that is done in a telephone office. The records of the amount of traffic are absolutely essential for all engineering work. They are the basis for determining the requirements, not only in regard to the amounts of switchboards, but the size of the buildings which it will be necessary to build. These records assume greatly increased value when they are kept in a uniform method throughout the various associated companies. With these uniform records, it is possible to compare the accomplishments in similar offices so that we can judge just how efficient a job is being done in one office compared with another fairly similar office. This work is under continuous study. Improvements are developed in the ways of maintaining these records and from time to time revisions of pages of the instructions are sent out and periodically complete new instructions are sent out. Early in 1923, we issued to the various associated companies a complete new set of instruc-

tions on these central office records and during the year 1923 representatives of our department has visited every one of the associated companies and assisted the local engineers in putting these new instructions into effect so that they would at once get the benefit of these revised and improved instructions. I would like to introduce a copy of these instructions as an exhibit. These are the local and toll peg count instructions and gi-e the best methods and supply a large number of forms for use by the associated companies [fol. 8157] in maintaining records of the actual business handled in those offices.

Q. Are they traffic circulars numbers 174 and 178?

A. No, they are traffic circulars Numbers 174, 175, 176, 177 and 178, making a complete set of circulars divided according to the uses. That is we have the local peg count instructions, for instance in 174, and a separate set of toll peg counts instructions in traffic circular 175, for the reason that we have many offices where the local and toll are both large enough so that they are administered by a separate force, and it saves in the supply of circulars if we have them separated, so that the toll business or office, only being interested in toll, can use that, and the local offices are furnished only with the local instructions.

Q. Are those five circulares included in one binder?

A. Yes, sir, they are included in one binder and they will make one exhibit.

Mr. Burr: We offer traffic circulars Numbers 174 to 178 inclusive, included in one binder, under the *Number* Allen Exhibit Number 7, the exhibit including the five circulars as offered in evidence.

Mr. Harshman: Do these circulars show the results of studies or do they merely show the method of making studies.

The Witness: These circulars are the method of keeping these records and are themselves the result of studies of the [fol. 8158] best way and studies of the best forms for doing this work. But these are not studies. These are more nearly instructions as to the best methods of keeping these various records. They show sample figures — many of the forms; that are of great convenience in the field in understanding the instructions if they can turn to some figures.

A. Am I correct in saying that a peg count primarily is a record of the number of calls, exchange or toll, handled,

and that it is used for determining the amount of switchboard and other apparatus required, as well as the number of operators necessary for each hour of the day and the efficiency with which the traffic is handled?

A. That is a correct statement of the basis need for these records.

Q. Why are they so very useful in the telephone business?

A. The handling of calls in the business of the telephone company, and this record which we get, which has been termed a peg count record, is the only means we have of determining the actual work which is done. That is, the call after it has been handled in the majority of cases, there is nothing physical that you can take hold of and count. That is the record must be made definitely at the time the work is done in order to have any record of the volume of business handled. And the reason for that of course is the future use in providing equipment and providing force and in determining the actual efficiency with which the various offices have been handling them.

[fol. 8159] Q. You do not keep the count by means of an actual board and *begs* as you used to; in other words, the term "peg in count" is really an anachro*n*ism is it not, in view of the modern way of keeping count of the traffic?

A. There has been a variety of methods followed in this, from the time when they had a box of peas or beans on the one side and a box or a bottle on the other, and when they made a call they moved a pea or a bean over. And they they had what is practically a cribbage board, where the operator moved the peg. That was the basis of the name.

We have recently developed it at various offices so that at those offices we have electrically operated counters, where the operator presses a small button on the key shelf and the call is electrically registered. And in various types of boards we actually have an automatic record of count of calls made without any action on the part of the operator. But the term "peg count" had been understood by the telephone people and there seemed to be no reason for changing the name.

Q. Do the engineers of the General Staff undertake to help the associated companies in matters concerning the handling and management of the operating forces?

A. They do. The telephone problem is in many ways different from any of the problems confronting the other concerns, even other utilities, in that we have to decide some

time ahead and hire and send people to handle traffic which we expect to get at some future —. The training period for [fol. 8160] operators varies from a few days or matters of that kind in the smaller cities to approximately five weeks in our large cities, so that we have to hire operators and train them a sufficient length of time to have them ready when we get the traffic. The problem is complicated by the fact that we have no control over the business which we are going to do at a certain time. If we were manufacturing brooms we could decide we were going to manufacture a certain number of brooms in one month. But we cannot decide how many telephone calls we will handle. We have to handle the telephone calls that are given to us so that these conditions make the problem or proposition of telephone management a very complicated one.

I would like at this time to introduce two exhibits. One is a typical curve of a telephone that is handling a large percentage of residence stations. The other is a typical curve of a telephone office handling a very large per cent of business stations, that is, stations or telephones located in the business section of the city.

Q. Is one of them marked traffic circular 117?

A. No, one of them is marked typical residence office and the other is marked typical business office.

Mr. Burr: They may be marked respectively Allen's Exhibits Numbers 8 and 9 and are offered in evidence.

And thereupon the circulars above referred to were marked for the purposes of identification and were offered and admitted in evidence on behalf of the Ohio Bell Tele- [fol. 8161] phone Company, and are herewith submitted, marked respectively Allen's Exhibits Numbers 8 and 9 and made a part hereof.

The Witness: On these curves you will see the problem that confronts the telephone management. We have in practically every office a distinct curve for that office. We have service 24 hours in the day, and in practically no two hours of the day do we receive a similar amount of business. On the curve marked "typical residence office" you will see that the peak of the traffic for the day in this office handling traffic largely from residences happened between nine and ten in the morning, that there was a gradual falling off in traffic then to a low point between four and five, a slight peak in traffic just before six o'clock when offices were clos-

ing, and then the social conversation representing a considerable peak between seven and eight o'clock. Then with a very sharp falling off in the service until night.

On the typical business office on the other hand you will see a rather different condition. We have there a peak hour of the day one hour later, between ten and eleven, with a fairly sharp falling off around the noon hour, with the low point reached between one and two, then with an afternoon peak and a very sharp falling off in traffic around shortly after six o'clock. Now we are confronted with the proposition that we have to supply a sufficient force to handle these calls each hour of the day, and if we [fol. 8162] are going to be efficient and not spend money that can be avoided, we want to fit our force so that we will have sufficient people there to handle the traffic each hour and not have a surplus during the hours when lower traffic is on.

So that we have studied this problem. The first instructions covering routines to accomplish these results were issued by the General Staff in the year 1903. That has been a continuous study since that time, and revised instructions have been issued from time to time as the methods were improved. I have a circular here tha- gives the instructions that were issued in September, 1921, and which have been revised since then from time to time. Certain pages in those instructions I think show the dates when revisions have been made, so that this gives the instructions which have been prepared as the result of studies in the General Staff which have been applied to the associated companies as a basis for this work of office management. That is traffic circular Number 117.

Mr. Shuler: You do not have any trouble with your business. You have a very good load there for about eight hours, which is about a girl's trick isn't it? What is difficult about the day's load there? The load is about an eight hour load?

The Witnes-: You would not suggest that you would provide the same people in an hour when you had as that curve shows about fourteen thousand calls as you would in hours [fol. 8163] in the afternoon when you have about 11,400, when one girl can handle say approximately 150 calls? There is a matter of probably 20 girls that ought to be on less even in that afternoon period. Just to show you how

elusive some of these things are, that is the hardest of all the curves that we have to do an efficient job on.

Mr. Shuler: It seems to me that the eight hour load would probably be your peak.

The Witness: You are probably the man we are looking for. You are wasting your time as a lawyer.

Mr. Shuler: Mr. Vail was a lawyer wasn't he? Mr. Young of the General Electric was a lawyer wasn't he?

The Witness: I have great respect for the lawyers.

Mr. Kinnison: I am glad to hear that.

Mr. Harshman: Have you a schedule of the operators that were necessary to operate these two typical offices that you have based these curves on.

The Witness: We have made out such schedules.

Mr. Harshman: Will you furnish us those schedules?

The Witnes-: They can be made out, yes, with no particular complications, although I say I haven't any such data with me.

By Mr. Harshman:

Q. Could you furnish it and have it with you when it comes to cross-examination?

A. Yes, I would be very glad to do that.

[fol. 8164] Mr. Burr: The traffic circular Number 117 is marked Allen's Exhibit Number 10 and offered in evidence.

And thereupon the circular, above referred to was marked for the purposes of identification and was offered and admitted in evidence on behalf of the Ohio Bell Telephone Company and is herewith submitted marked Allen's Exhibit Number 10 and made a part hereof.

By Mr. Burr:

Q. Mr. Allen, I am inclined to think that you and Mr. Shuler were perhaps talking at cross purposes, and that you did not understand the question or perhaps he did not understand the exact significance of the exhibits 8 and 9. Calling your attention to Exhibit Number 9, if I understand the purpose of the exhibit, it is to show how the load fluctuates. That is right, isn't it?

A. Yes, sir.

Q. It is with the knowledge od the fluctuation of the load that you are able to determine the number of operators

more or less which must be used at the board during the time so covered by the chart; that is correct?

A. That is correct. The object being to have sufficient operators there. One of the complications on that curve is the fact that the traffic during the noon hour — only to about 9500 calls, and you have a very difficult proposition in getting enough time to give all of the operating force a lunch hour, due to the fact that there is a considerable amount of telephone calls put in by people who are supposed to be taking their lunch, so that that is one very [fol. 8165] complicated thing to meet that situation.

Mr. Shuler: Seriously, wouldn't any up-to-date manager find that out in a few days without you folks charting it, that he did not have enough people on his board during those hours.

The Witness: No, it is a very difficult proposition to determine the exact force that will fit the traffic and not have too few or too many at any given time.

By Mr. Burr:

Q. The operating companies chart the load do they not?

A. They do to some extent. More of it is kept on forms which are given in 117, which shows the actual amount of traffic each hour throughout the day. With certain breaking down into half hour periods during parts of the day when traffic is increasing or falling rather rapidly.

Q. I think that Mr. Shuler had reference to the face that Exhibit Number 9 shows between say the hours of ten in the morning and five in the evening what he terms a peak load. Let me ask you whether or not as the result of these studies the force at the board is reduced from time to time and increased from time to time between ten in the morning and five in the evening?

A. It is. And in many offices before this work had developed to the point where it has now arrived, it was found that many of the people were providing practically a flat force in offices of that kind throughout the day, and by the instructions and data showing them how to reduce the force in certain hours of low traffic, a very considerable economy [fol. 8166] has been made.

Q. Why is the making of these charts or rather the supplying of the information shown on the charts one of the most difficult things which you have to do in the way of

charting different matters connected with your work? I think you said that a moment ago?

A. Yes. It is a proposition of suiting not only the force to the traffic curve so that we will have sufficient people at all hours to handle the traffic and being able to reduce that force in lower hours and at the same time allow our operating people, who are the operators at the switchboard, reasonable hours for their lunch periods, reasonable hours for relief periods, which we plan to give during approximately the middle of their half day's work, so that the proposition of accomplishing all of those results, having sufficient people there and no waste and at the same time assigning reasonable hours of work to the operating force, is the reason why that work is of a complicated nature and why the chances for considerable economies or considerable periods when the force is not on in sufficient numbers, which might result in poor service; and those things are not matters which even to an expert traffic man can be done as a matter of casual inspection. It is a result that can only be accomplished by careful mathematical calculations, combined with judgment, gained through a considerable amount of apprenticeship in work of that kind.

Q. Have you another traffic circular Number 200 relating [fol. 8167] to toll office management?

A. I have. This circular is typical of the circulars we issue to the associated companies, showing the men who are responsible for operating the various telephone offices, the latest and most up-to-date method of office management. It is traffic circular Number 200.

Mr. Burr: It may be marked Allen Exhibit Number 11 and we offer it in evidence.

And thereupon the traffic circular above referred to was marked for the purposes of identification and was offered and admitted in evidence on behalf of the Ohio Bell Telephone Company, and is herewith submitted, marked Allen Exhibit Number 11 and made a part hereof.

Q. It is by these means in part that the General Staff undertakes to assist the associated companies in matters concerning the handling and management of operating forces?

A. Yes, sir, these are typical on that. The circulars are typical of the information supplied them and the items of

work which I have outlined I think are typical of the large variety of work which we carry on for the benefit of the associated companies.

Q. Do they cover all of the ways in which the General Staff undertakes to help?

A. No, I think this is really a very small part. I have put in seven or eight out of a matter of 250. Many of the other things have only touched very small part of the actual work we are doing.

[fol. 8168] Q. In addition to circularizing the associated companies, does your department maintain a personal contact between your members and the members or employees of the associated companies, for example the Ohio Bell Company?

A. We do. Representatives of the department very frequently go to the cities of the associated companies to assist them either in starting various new instructions, getting them interpreted properly or in helping in specific jobs applying to traffic work.

Q. Can you recall any specific instances of your own visits or the visits of men of your department to Ohio in recent years in connection with the services rendered to the Ohio Company?

A. Yes, I have in mind some instances of that kind. Mr. Remmon, one of the men working on toll office management represented by this last exhibit, is in Cleveland this week, helping the company on various matters of that nature. Mr. Meeker, who is the man who heads up the division working on the peg count records, spent some time in Cleveland during the past year assisting them in getting those routines going. Mr. Crowe——

Q. You say some time—You mean a day or what?

A. He was there during the past year two different periods of a week in each case. Mr. Crowe, who heads up the section on the force adjustment, has spent two periods of a week in each case during the past year with the Ohio Company. I have personally been from time to time on an average I should say of a couple of times a year in Ohio [fol. 8169] Company offices, assisting them on various problems of this nature.

Mr. Dotson: That service would only be beneficial to Cleveland.

Mr. Burr: Why.

Mr. Dotson: That is what I am trying to get at.

The Witness: Why we work in a great many of those cases with the general traffic men of the Ohio Company who are responsible for carrying on that work throughout the Ohio Bell Company's offices in the state. In fact Mr. Meeker carried on one of the weeks that he was out here on peg count—the work was carried on in Akron, that being a good city to experiment with that work and get it started.

Mr. Dotson: Mr. Meeker's work then was not with the operative department of the Cleveland exchange; it was with the state officers of the Bell.

The Witness: In that particular case he was working with Mr. Michaels who is the general supervisor of traffic of the Ohio Bell Company and is responsible for that work in the Ohio Company.

Q. You speak of these men having *done* to Cleveland. Where are the general offices of the company?

A. They are in Cleveland.

Q. Where is the general traffic manager?

A. His offices are in Cleveland, 4300 Euclid Avenue, Cleveland.

Q. That was the reason why primarily these men went [fol. 8170] to Cleveland was it not?

A. Yes, sir. Yes, although Mr. Coffee was here about two months ago and worked in Columbus, Canton and two or three of the other cities throughout the state on work where it was felt that it could be accomplished with better results by being in those cities.

Mr. Dotson: Is that all of the service you know of having been rendered in behalf of the Ohio Bell Company in this respect?

The Witness: No, I was simply giving those as typical instances, of men in their own particular department who have been here.

Q. During the past year?

A. Yes, sir.

Q. That then does not necessarily cover all of the cases?

A. No, there are many other cases of men in the traffic department on the General Staff working in the Ohio Company territory, giving them assistance or help in traffic problems.

Q. How frequently if at all did you men connected with the traffic department of the Ohio Bell Company go to New York and discuss there these problems with you and your people?

Mr. Dotson: If you know?

The Witness: If you would like to have me read in the record I can read a considerable list of those.

Q. All right.

A. I might read a few just to show it. I have here eleven pages, just giving short instances of men who have been [fol. 8171] in various—particular men who have been on trips to Ohio, and I have a list of several pages of cases of men from Ohio being here.

Q. That is being in New York?

A. Yes, sir. Mr. Rayner was in Cleveland and worked with Messrs. Green and Anthony and Marcoes. That was 11/3/23. Mr. Remmon was in Youngstown in November, 1923. He was in Dayton and Columbus. Mr. Coffee was in Dayton, Columbus and Cleveland in November, 1923, Mr. Barbour was in Cleveland in December 1923. Mr. Froeliger and Mr. Darrow were in Cleveland in May and June 1923. I have a list of several pages of those.

Q. I think that will satisfy the curiosity of the gentlemen from Toledo.

Mr. Dotson: That depends on what portion of those pages is taken up by comments other than the mere mention of the visit.

Mr. Burr: That is all for this witness, for the present.

Cross-examination.

By Mr. Dotson:

Q. You were speaking in your testimony awhile ago about a saving of sixteen million dollars. That statement was made in connection with your switchboard testimony. In what was *was* this saving accomplished?

A. That was accomplished by the introduction of im- [fol. 8172] provements in the switchboard which reduced the amount of time which it took the operators to handle the traffic, thereby increasing the number of calls handled and reducing the number of operators that were required in the system to handle the traffic.

Q. Now, how was that information or result tabulated? From actual records of time that were secured in the daily routine business of the various associate companies over a given period of time, or was that just an estimate made by the General Staff based upon certain information that it believed it had with reference to the average time it would take a certain number of operators to handle a certain number of calls?

A. Now that is made by applying to the number of calls that are handled of various types the actual savings as shown as a result of the studies which we had made and which are under practically a continuous check by our people to see that the results as outlined during the studies are secured throughout the field.

By Mr. Shuler:

Q. Then by that, Mr. Allen, you only mean this, that the associated Bell Companies during that year received in revenue sixteen million dollars more money.

A. No, it means that the associated companies in that year spent sixteen million dollars less in expenses that they would have spent had not these improvements been made.

Mr. Kinnison: The rate is constant.

Q. But they had that much more income, they had sixteen [fol. 8173] million dollars more income that year for development purposes than they would have had if they had not introduced that development, isn't that true?

A. Yes, sir.

Q. Certainly?

A. That is what I am claiming.

Q. So that you say they saved sixteen million dollars?

A. Yes, our work made it possible to have that much more.

Q. That money being owned by A. T. & T. all went right back to A. T. & T. again?

A. I don't know that.

Q. Those companies being owned by A. T. & T., that money all went right back to A. T. and T. again?

A. I do not know that that follows.

Mr. Burr: That is not a necessary inference.

Q. In other words, the subscriber received nothing for that. His rates were fixed and were just the same?

A. Possibly I may have led you wrong on that. I think I should have probably stated this, that this saving was to the public of the country rather than to the companies.

Mr. Burr: Why?

Mr. Shuler: You reduced the rates?

The Witness: Anything that we do that makes it possible for us to operate more efficiently is ultimately a saving to the telephone subscriber.

By Mr. Shuler:

Q. Can you show me one place in the United States where [fol. 8174] an associated Bell Company ever reduced its rates because of a reduction in expenses by the General Staff?

A. I think the——

Q. No, answer my question?

A. Oh yes the rates from the start of the business will show a great reduction.

Q. I did not ask you that. Answer my question. When was this sixteen million dollars made, this -aving, what year?

A. This figure I am quoting is for the twelve months ending November, 1923.

Q. Ending November, 1923? Now where any place is a result of that saving have rates been reduced? In fact you know that in every place in Ohio they are asking for increased rates? Do you know that they are in Ohio asking for increased rates?

Mr. Burr: They are not.

The Witness: I don't know that.

Q. Let's say in 75 per cent of the telephone districts of Ohio they are asking for increased rates. Do you know any place in the United States where rates have been reduced?

A. Economies from any operation would necessarily result in a saving to the public. It might be a case that would keep the companies from——

Q. Please answer my question.

Mr. Burr: Let him answer.

The Witness: In fact from increasing rates such as would be otherwise necessary if these economies had not been made.

Q. Do you know anything about rate structure?

A. No.

[fol. 8175] Q. You are a traffic man?

A. Yes, sir.

Q. Do you know anything about the cost of operating the General Staff in New York?

A. I do not.

Q. Do you know anything about the expenditures?

A. No, sir.

Q. Do you know anything about the charges made for these services, who are charged with it? Is Western Electric charged anything if you know?

A. I don't know.

Q. You don't know who is charged with it do you?

A. No, I know that the associated companies——

Q. You answered my question?

A. Have the license contract on which they pay a certain amount.

Q. That is all you do know about that?

A. Yes, sir.

Q. Awhile ago in answer to Mr. Burr's question you said there was no charge made back to the telephone companies for these services. As a matter of fact you don't know anything about that?

A. I made the statement that there was no charge made other than the license contract, and I know that is true.

Q. How do you know it?

A. It is my business to know those things.

Q. Are you in the accounting department?

A. No, sir.

Q. Why don't you know whether the Western Electric is charged?

A. I am in the telephone business, a member of the General Staff, and that is a matter that from time to time comes up.

[fol. 8176] Q. Do you know whether the Western Electric is charged anything?

A. I do not know.

Q. Your services are of value to them in building switch-

boards; your services are valuable to the Western Electric in the construction of switchboards?

A. I haven't any knowledge in connection with that feature, no.

Q. They make all of the switchboards?

A. They make all of the switchboards that we install, yes.

Q. Therefore if you make any improvement, it is of value to the Western Electric Company isn't it in cheapening the construction?

A. I think it is of value to the associated companies in getting boards at a lower price.

Q. But it is not in your opinion any value to the Western Electric?

A. I do not see any connection there.

Q. Answer the question. Now you spend considerable money in making these charts and investigations and all these things do you not?

A. Yes, sir.

Q. Considerable money?

A. Yes, sir.

Q. Now, is there anything known to you in your field as switchboard cost per station does that have any meaning to you? What I mean is this, what is the cost per station of switchboard service?

A. In what particular.

Q. Let me put it this way. Every telephone has a per station cost of operation has it not? Its expense of operation is so much per station?

A. To arrive at the expense per station—you could figure that.

Q. You could figure that couldn't you?

A. Yes, sir.

[fol. 8177] Q. This expense was made up of various items —They are made up of many items, labor material and all of that; h-s it ever been figured out what the switchboard cost per station of an economically managed and well-equipped exchange should be? Do you know?

A. No, I haven't any figure of that kind.

Q. You have never studied that out?

A. It is a matter that would be affected by conditions surrounding the office, calling rates and various things of that kind.

Q. How would the calling rates have anything to do with that?

A. The calling rates have a very direct effect. If in a given city you have six called per station per day and in another city you have eight calls per station per day, your expenses for operators to answer those calls will be in direct proportion to the calling rate.

Q. Have you worked out anything on that line, basing it on the calling rates, what the switchboard costs per station should be?

A. We have advanced quite a long ways. We used to consider that figure years ago, but we have found that that was not a very valuable figure in office management, and as I outlined in my testimony, we have worked up a very definite routine, so that we can reduce the traffic in an office to a unit basis and give each a cost per thousand units, which takes into account the amount of traffic that is handled and the complications such as whether calls are trunked or local.

Q. What is the cost in an efficiently managed well-equipped [fol. 8178] exchange?

A. That would very quite directly according to the wages it was necessary to pay the operators in a city. We have very few cities where the operators' wages would be the same. Those wages might vary all the way from twelve to twenty-five dollars a week.

Q. Then your services are not worth a penny to the various associated companies so as to tell one company whether their plant is efficiently and economically managed and it is about right on that or it is too low, or tell them what they are doing in some other plant of approximately the same size and condition? You do not give them any service like that at all?

A. Yes, we render service of that kind, but we do not render it until we know the conditions existing in the particular city we are talking about in regard to these various propositions, such as wage rates and things of that kind. That is a very important part of our business, rendering assistance to them on that subject.

Q. That is what I have been trying to get you to state and you won't state it. Can you state that proposition in your own language?

Mr. Burr: Will you state it again? We have gotten a long ways off.

Mr. Shuler: He seems to know what I want. He says he is doing the work I have asked him the question about.

Mr. Burr: If you will excuse my ignorance I would like to know what it is.

[fol. 8179] Mr. Shuler: I am trying to find out, Mr. Burr, this. Isn't there some unit cost of switchboard operation and equipment based on station calls—I don't care how you base it.

Mr. Burr: That is why I want you to ask it. You are mixing up things that won't mix. You are asking for a unit cost covering switchboard operation and cost. Now the two are absolutely separate and I don't believe any witness can answer the question.

Mr. Kinnison: The witness has not said so.

Mr. Shuler: He said he could. He said he had been making those very studies. I said, "Tell me what they are."

Mr. Burr: Let- see what he answers.

The Witness: If you get to the point of how many units an operator has ordinarily to carry, there we have a very definite idea, and we expect that the average over-all load of operators would be around 230 units per employee hour per day. Now you cannot get out any cost basis without taking in the element of what the wages are in the given town.

Q. I am perfectly willing to take your statement. Now what is that in Cleveland, Ohio.

A. Oh, I don't carry in my head the unit costs.

Q. You have the data on it have you at your office?

A. Absolutely.

Q. And in Akron and in Toledo and in Canton?

A. Yes.

[fol, 8180] Q. Have you sent each one of them copies of that data to tell them why they are low and what they should do to bring it up to the efficiency of the other?

A. We from time to time, some of us working in the field, would take up matters of that kind if there were any cases that looked to be doubtful.

Q. Don't you think that is an important thing?

A. Yes, but that is primarily the function of the traffic officials of the Ohio Company, to run their offices efficiently.

Q. You are not bothered then with whether they run them efficiently or not?

Mr. Burr: Oh, he did not say that.

Mr. Shuler: Yes, he did. Read that, Mr. Stenographer.

(Answer read.)

Q. But you don't check on them to see that they do.

A. Yes, we do a certain amount of checking to see that they do, render any assistance we possibly can to help them do it more efficiently.

Q. Take this business chart here, typical business chart. Now on the peak load, how many operators could there be in that office there?

A. That curve is stated in calls and would have to be reduced to a unit basis. Now one could tell you from that chart how many. That is merely a basis from which the routines carrying through—you would have to have considerable additional amount of knowledge.

[fol. 8181] Q. If you said a while ago in your direct examination that the purpose of this chart was to show the superintendent or whom ever is in charge of the operators the number of operators he should have to take care of the business—Am I right?

A. No, you are not.

Q. What did you say on that?

A. That curve merely shows the hourly variation in traffic, and I introduced it to help illustrate one of the elements of force adjustment.

Q. Didn't I say to you that any good manager ought to know without having this chart made for him how many operators he should have in his office to take care of the calls?

A. Yes, I think you said something very similar to that.

Q. You said, "No, he couldn't", didn't you? And then didn't you follow up and say that the purpose of this chart was to show him the number of operators he should have to efficiently and sufficiently carry on the calls?

A. No.

Q. You did not?

A. No, I said part of that. I did not say the last part.

Mr. Shuler: That is all I care to ask.

By Mr. Kinnison:

Q. Mr. Allen, say a typical city having about 16,000 stations, how many exchanges should they have in your opinion?

A. You would have to study the conditions in that city.

[fol. 8182] Q. Can you take it as a typical city?

A. No, I don't think there would be any typical city with that amount of data.

By Mr. Shuler:

Q. Let me ask you a question there. What is the value of that chart?

A. That chart is merely as I say an exhibit that shows one of the complications in this technique of adjusting operating forces.

Mr. Harshman: Mr. Allen, you said by adding a call an hour you could probably save in the neighborhood of a million dollars a year to the associated companies?

The Witness: Yes. If we should have each operator handle one additional call per hour as far as the actual operating -ages are concerned we could save a million dollars every year.

By Mr. Harshman:

Q. Now have you any circulars or reports showing the results of your studies on the basis of the instructions you have issued that are now in force in the various associated companies on the effect of loading?

A. We have these circulars similar to the ones I have entered here.

Q. You haven't any reports or studies that show the results of your instructions on loading such as are now in effect?

A. No, that is not put up in circulars.

Q. Do you have any data or any reports in your office showing that?

A. No, I think that is in the line of a definite report.

Q. Well, if you have no report in your office on that subject how are you able to make the statement to this commis- [fol. 8183] sion that by making this one additional call per hour per operator you could have a saving of one million dollars?

A. That is merely the result of a very plain mathematical calculation. We know how many calls we handle now and how much it costs us.

Q. But when you have no reports to show the results of these instructions, taking into consideration what you described a while ago as the effect of one thing or another, how do you know that these instructions you have in force are producing the results you intend them to be to enable you to make such an estimate?

A. I don't believe I understood your previous question. Yes, we have reports in our office for every office in the country, showing the number of calls that are handled per day in the telephone offices. We have such reports. I thought you were asking about reports for the whole country. You tied it up to studies which we have made. We have reports based on the instructions in these circulars, showing the actual number of calls and the loads handled in every office throughout the country.

Mr. Kinnison: In actual operation a saving of one second per call on the part of the operator actually reduced the operating personnel?

The Witness: Absolutely. There is no doubt about it.

By Mr. Kinnison:

Q. That is on the basis that they did operate at maximum efficiency?

A. If we reduce work on any one call, we proportionately [fol. 8184] increase the number of calls which we would ask the operators to handle per hour.

Q. Do you mean to say literally if they had eleven operators and you reduced the call one second, the usual operation being eleven seconds, that you would take off an operator?

A. I would have to analyze the thing to find out whether that actually worked out, but that is in general a correct statement.

Q. It would not operate to a reduction of one eleventh of the expense of making the calls?

A. No. It might mean in certain hours you would reduce by one operator during that hour. Some other hour you might reduce by two operators. You cannot take off a fraction of an operator. But the thing generally speaking works out that as you reduce the time taken you reduce the number of people.

Q. Did I understand you to say by reason of trunking from one exchange to another, you increased your operating call by four seconds, one fifteen and the other eleven?

A. It is more nearly ten with the equipment we have now, than fifteen.

By Mr. Harshman:

Q. Referring again to the reports on loading, will you furnish those reports for the cities affected in this hearing?

A. You could get those reports much better if you got them from the officials of the local company.

Q. We would like to have them from the General Staff as well. Also when it comes to cross-examination we would [fol. 8185] like to have you be prepared to furnish us the full and complete information with reference to the La-Crosse and the Wilmington boards about which you have testified in your examination in chief today. We expect to go into that.

(No reply.)

By Mr. Burr:

Q. So the photograph showing the operators at work in the exchange——

A. I think that was Exhibit Number 3.

Q. Represents actual operation?

A. Yes.

Q. Was the exchange in operation at that time?

A. The office was actually in operation at the time.

Q. That picture was taken?

A. Yes, sir.

Mr. Maltby: That possibly represents peak operation there doesn't it?

The Witness: Yes, this was taken in an office during the busy period.

Mr. Maltby: Now take the period say at nine o'clock at night at the same office, there would be comparatively few operators wouldn't there?

Mr. Burr: Use seven o'clock instead of nine.

Mr. Maltby: All right, say seven. How are those calls coming in at that hour switched? Is it so connected that they can be switched from one position?

The Witness: No, it is not. On this particular board, the line lamps on which the calls come in are multiple, so that until we reduce practically one operator in nine, that [fol. 8186] is, if we had nine in busy hour and kept reducing until we had one operator, she would still be able to reach any call that would happen to come in.

Mr. Maltby: Because it would show up in nine positions?

The Witness: It would show up on every third position, so that sitting in the middle position she would be able to reach the wire.

By Mr. Shuler:

Q. She does not need to run from her position to four or five positions down.

A. Not until it would get so that you had less than one operator in nine, which would be the night condition, possibly after ten or eleven o'clock.

Q. She would have to leave her position?

A. Then we would reduce the force to such a point that the calls would be answered by the operator going to the position calls come in.

Q. Are you doing anything to prevent being cut off by the operator? Gad, that is the biggest nuisance in Cleveland today.

A. Yes, we are continually studying — service proposition- and have introduced within the last two or three years a number of improvements which we feel sure—such as the fanning of cords on the B board—That the operator will take the cord, so that the cords come up and they will take that fanned out appearance rather than this appearance. We have also arranged so that the cords will cross to the least possible extent.

[fol. 8187] Q. I wish you would take some of your men off of the tree pruning division and put them on there?

A. Of course you have to consider on any proposition where we have either human or mechanical devices that there will be occasional things go wrong. Our endeavor is to reduce that both on cut-offs and other service irregularities to a minimum.

Q. I would like to get something for my own information locally. Why is it in Cleveland today we are having more trouble with disconnections than we have had in many years?

A. Do you mean cut-offs?

Q. Yes. Not only cut-offs, but to go to the phone, your phone rings and you go there, and they say, "Nobody on your line," or "Nu-ber please", or "Excuse me please." In my residence that happens at least twice a day.

Mr. Harshman: I didn't know your residence was in Dayton.

Mr. Shuler: This is Cleveland.

Mr. Harshman: That is an accurate description of Dayton.

By Mr. Burr:

Q. Mr. Allen, isn't it true that the inability to do the proper amount of tree trimming, due to the importunities of the owners of the trees, often introduce- and account- for disconnections such as referred to by Mr. Shuler?

A. Yes, any equipment trouble has a very direct reaction on the grade of service that is given.

[fol. 8188] Mr. Kinnison: Causes the cord to drop out of the hook?

By Mr. Dotson:

Q. You have made a study of the interruptions just talked about because they seem to be so prevalent; you regard them sufficiently important to command the study of the General Staff?

A. While there are any of them we will consider it so important we will give it study.

Q. Has your study resulted in your being able to determine the cause of the interruptions?

A. Yes, we have found many of the causes and as I instanced to Mr. Shuler, I gave one little means which we have used to try to reduce those, and that is only one of several. We have a traffic circular issued to the associated companies, in which we devote the whole circular to just such propositions as means of preventing cut-offs, means of prevent- wrong numbers and the various troubles that come up in the service.

Q. Have you found from your study that the same cause is to be found in all of these exchanges where those troubles exist?

A. No, there would be various reasons. One of them might be prevalent in one exchange and another in another.

Q. What are the most prevalent causes of those interruptions?

A. You are referring now to cut-offs?

Q. Yes?

A. Why they might be caused in some cases by failures on the part of the equipment, the supervisory signals or something of that kind, to function properly, and in other [fol. 8189] cases by a large percentage of new operators. If we run into a period of prosperity in a city and the girls show a high turnover, so that we have to take on many new girls, and we have to take these new girls whether we want

to or not, until we are able to train them to proper degree of efficiency, they will occasionally take down a call when they should not. We have instructed our operators, particularly new ones, instead of glancing at a cord and pulling it, to go up and manually trace it.

Q. You have found the cause to lie frequently within the exchanges themselves where the operators are working and due to the failure on the part of the operator to properly manipulate the equipment?

A. We have occasions where the investigation leads to very poor work on the part of private branch exchange operators, and on those occasions we get in touch with the people responsible and try to get them to train their forces, and we do keep a force to train private branch exchange operators.

Q. The reason I ask these questions is we are having an immense amount of trouble in Toledo about that, and I have been harangued a great deal by users about it and I had no means of advising or explaining or anything of the kind. I thought maybe you could give us some light. Can you tell the average time it requires to go through a call over the LaCrosse switchboard?

A. Yes, we have made studies on that. I think as I remember the figures it was about seven seconds.

[fol. 8190] Q. About seven seconds?

A. In order to be right within a fraction I would have to verify that.

Q. That is then a reduced time below that which is required over the boards used by the associated companies?

A. Compared with some of the boards, compared with for instance the board that would prove in in a city like Columbus; that is not the number one-C board in Youngstown; the work time on that as I remember it is about eight and a half seconds.

Q. Is it that reduced time which the LaCrosse board permits the call to be placed that you regard as the most important feature of the board which you are desirous of utilizing in all your boards?

A. Yes, that would be the only object in using a board of that kind, and in case that economy in operation can be secured without spending more money for additional equipment that offsets the gain in traffic, we would use that equipment.

Q. What is the so-called traffic unit and what is it in matters of seconds of time?

A. Well, that varies somewhat. The traffic unit that we use is one hour, which is 3,600 seconds, divided by 230, which is the basic unit. It gives you in seconds 15.65. That includes both the actual work time of the operator and the necessary amount of idle time which we have to have, that is, you cannot work an operator a hundred per cent of the time and get the signals answered and the various things happen so that the over-all time per unit is 15.65 seconds.

Q. What kind of a call would that be that would require [fol. 8191] that unit in matter of time?

A. The only call that corresponds to that is a local call on a standard Number One board. That is the one that more nearly corresponds to a unit than any other.

Q. That would only apply to a call through the same exchange?

A. Yes.

By Mr. Harshman:

Q. You divide 3,600 by 230. What is the 230?

A. The 230 is the average hour load which we consider standard.

By Mr. Shuler:

Q. That is about all a girl should do per hour is that right?

A. Yes, sir.

By Mr. Kinnison:

Q. These innovations that you have evolved for switchboard equipment, effecting the savings you have testified to, are they more or less adopted by all your associated companies?

A. Yes, they are very generally in operation through the associated companies.

Q. In compiling your figures do you do it on the assumption that they uniformly do it?

A. No, we do it entirely on the basis of the records showing definitely that they have been adopted, as we have in certain cases still B boards on which the ringing is done manually, and in arriving at a figure showing the saving due to that particular feature, we include only the boards

were the boards have actually been changed over to machine ringing.

Q. In some cases too expensive a job though?

A. Yes, there are many cases where a board may not be to a point where it will have to be replaced. That is, it may [fol. 8192] be that two or three years from now the board will have to be replaced. And that is taken into consideration, whether it would be advisable at this time to put in the board or whether it would pay for itself in the life of the board.

By Mr. Dotson:

Q. In the LaCrosse board is the cord selected by a machine switching equipment or is it a multiple lamp scheme?

A. In the LaCrosse board the switches select a lamp and the operator has to pick up a cord and plug in on that lamp similar to the Number One Board which I introduced as Exhibit Number One.

Q. That is done by a machine?

A. It is done by a relay switch which connects the subscriber's lines to a line lamp. A call coming in of a number of lines may be thrown on these line lamps, which are multiple through the different sections of the board.

Mr. Burr: May Mr. Allen be excused at this time?

Mr. Dotson: Just a minute.

By Mr. Dotson:

Q. Do you know the difference in time between the machine switching equipment which selects a cord and the multiple lamp scheme?

A. Yes, there is a matter of—There would be a saving of about three quarters of a second, if the call definitely came in on the operator's head set, rather than her having to pick up a cord and plug in on the jack.

Q. You say it would only make a difference of about three quarters of a second?

A. Yes.

[fol. 8193] Q. Is that regarded as a material difference by your Staff?

A. Yes, we would like to make savings of three quarters of a second if we could do it without spending too much for equipment so that we would have a net loss.

Q. Have you any way in any of your exchanges of machine switching equipment such as we are speaking about?

A. Just what do you refer to? To the distribution of calls by machines to cords?

Q. Yes?

A. Yes, that is the condition in the Wilmington board which I mentioned.

Mr. Burr: Will the Commission fix at this time the date when Mr. Rhodes and Mr. Allen are to return if at all?

Commissioner Poor: Does this finish your case?

Mr. Burr: No, but they are going to New York so that we can tell them later on.

Commissioner Poor: I think you better wait.

Mr. Burr: Let it be understood that Mr. Rhodes and Mr. Allen may leave the city today to return on call.

And thereupon the further hearing of this matter was adjourned to Thursday Morning, February 28th, 1924 at 10:00 o'clock A. M.

[fol. 8194] Thursday Morning Session

February 28th, 1924.

And also A. B. CRUNDEN, called as a witness, on behalf of The Ohio Bell Telephone Company, being first duly sworn, testified as follows:

Examined by Mr. Burr:

Q. You may state your name?

A. A. B. Crunden.

Q. Age?

A. 46.

Q. Where do you live, Mr. Crunden?

A. In Brooklyn, New York; I am employed in New York.

Q. What is your occupation?

A. General supervisor of accounting methods for The American Telephone & Telegraph Company.

Q. How long have you occupied that position?

A. For two years.

Q. Prior to that time what was your employment?

A. Well, I have been in accounting and statistical work for about 25 years, and I have been in the telephone ac-

counting and statistical work since 1910 when I entered the employment of the Chicago Telephone Company as general bookkeeper. At that time The American Telephone & Telegraph Company had developed a new and more accurate accounting system to meet the increasing demands of the business and I was brought into the system by the Chicago Telephone Company to install that accounting method.

[fol. 8195] I was subsequently auditor of disbursements of the Central Group of Bell Telephone Companies, consisting of *hwat* is now The Illinois Bell Telephone Company, The Central Union Telephone Company, The Wisconsin Telephone Company, The Michigan State Telephone Company and what was then The Cleveland Telephone Company.

Later I became general auditor of The Cleveland Company and vice president and general auditor of The Central Union Telephone Company.

When the Central Union Company was divided up, I was transferred to New York and became Assistant Chief Statistician of The American Telephone & Telegraph Company, and occupied that position for about a year and then assumed my present duties.

Q. You were then in the accounting end of the Bell System from the year 1910, continuously down to the present date?

A. Yes, sir.

Q. Before the so-called division or dividing up of The Central Union Telephone Company, did that Company operate properties in Ohio?

A. It did, Mr. Burr.

Q. To what extent?

A. Well, it operated generally throughout the State in most of the large cities exclusive of Cleveland and Cuyahoga County, which was served by The Cleveland Telephone Company.

Mr. Dotson: Mr. Burr, may I ask a question for information? The Central Union had local and long distance lines, did it not?

Mr. Burr: It had local lines, and some long distance.

[fol. 8196] Mr. Dotson: Yes, and all those local exchanges and long distance lines were taken over by the Ohio Bell?

Mr. Burr: Everything which the Central Union Telephone Company owned in the State of Ohio was taken over

by the Ohio Bell. By that I am of course referring to telephone properties.

Mr. Dotson: Yes.

Mr. Burr: And I am also excluding the depreciation reserves.

Q. Have you a chart of the General Staff organization of The American Telephone & Telegraph Company?

A. Yes, sir.

Q. Will you produce it please, and have it marked Crunden Exhibit No. 1?

A. Yes, sir.

And thereupon the chart above referred to was marked for purposes of identification as Crunden Exhibit No. 1.

Q. Is the chart which has been so marked the one to which you refer?

A. It is, Mr. Burr.

Mr. Burr: We offer it in evidence.

And thereupon the chart above offered was admitted in evidence on behalf of The Ohio Bell Telephone Company and is herewith submitted, marked Crunden Exhibit No. 1, and made part hereof.

[fol. 8197] Q. Tell the Commission of which department you are a member and what work is done in that department in behalf of the associated companies of the Bell system, including The Ohio Bell Telephone Company?

A. The department of which I am a member is the Comptroller's Department. You will find that the name of the Comptroller, C. A. Heiss, is shown in about the central part of the chart and on the second line from the bottom.

The Comptroller's Department performs, in behalf of the associated companies, what might be called the research and development work which is required with respect to the accounting, statistical and certain financial functions of the business.

This department also makes complete annual audits of the general books of the associated companies, including The Ohio Bell Telephone Company. It also maintains a close study of the financial needs of the associated companies and furnishes to them expert advice and assistance in procuring the large amounts of additional funds which are constantly required for additions and betterments.

The accounting and statistical work which is done in behalf of the associated companies relates both to the principles and to the concrete methods of administering the accounting system, and making a practical application of the correct principles.

We are continually studying in New York the most economical and efficient methods of recording, analyzing, and disposing of the many items of revenue, expense and prop- [fol. 8198] erty which have to be treated, and we are constantly designing and redesigning forms and preparing and distributing standard routines or methods.

The activities of the Comptroller's Department also include representation before The Interstate Commerce Commission in the numerous accounting matters that are constantly cropping out.

We also conduct investigation in cooperation with our Department of Engineering in connection with the economical purchase and use of materials, stationery and other supplies and of labor-saving machinery for electrical work.

Our work also includes advice to the associated companies upon the best methods of statistical work, and we send to them a large amount of information showing the financial and operating results of the various units of the System so as to assist them in estimating their own performances.

The necessity for all of the work of this kind is of course common to all of the Bell Companies and it is work which can be performed most economically and efficiently by a single group of specialists acting jointly for all of the Bell System companies.

Q. Are all of the services to which you have referred in that answer furnished to the associated companies and for their benefit by the General Staff?

A. They are, Mr. Burr. The total number of employes in the General Staff organization is about 1824. About three-fifths of them are men and the other two-fifths are [fol. 8199] the clerical force, mainly female. In the Comptroller's Department there are generally about 254 people. In the Financial Department, which is very closely allied with ours, there are 276 people.

Q. Take up next, if you please, the several branches of your particular Department and explain them briefly?

A. I would like to offer a supplemental chart which shows

on a larger scale the Comptroller's Department and its organization.

Q. Mr. Crunden, before proceeding with your answer and in order not to have to repeat the same matter over and over again, will you tell the Commission whether or not the services which you have been describing and are about to describe, are services furnished by the General Staff of the American Company, and particularly by the Departments to which you are referring, from time to time for the benefit of the associated companies, including the Ohio Bell?

A. I understand. I will talk with reference to that work specifically and I shall have that work in mind in what I say.

Q. I do not want to have to ask you each time whether a particular service which you have described is rendered to the associated companies, including the Ohio Bell?

A. Very well.

Q. And if it can be understood that all of these services to which you are testifying are rendered to the Ohio Bell Company, among others, it will shorten the inquiry. With that understanding, will you please proceed?

[fol. 8200] A. Yes, sir.

Mr. Burr: The chart just referred to may be marked Crunden Exhibit No. 2 and is offered in evidence.

And thereupon the chart above referred to was marked for purposes of identification and was offered and admitted in evidence on behalf of the Ohio Bell Telephone Company and is herewith submitted, marked Crunden Exhibit No. 2 and made part hereof.

The Witness: Shall I proceed, Mr. Burr?

Q. If you please.

A. As I stated, there are 254 employes in the Comptroller's Department, and about 75 of them are experts in the ordinary sense of that term.

The men at the heads of the various divisions are men of considerable experience. Perhaps I might offer myself as an exhibit. And the men that report to the division heads, that is, for example, men reporting to me, are accountants of considerable experience and such men as would occupy positions of auditors of receipts and disbursements of railroad companies, or auditors of large sized corporations, or men that would be competent to go out and upon their own

experience and initiative conduct public accounting investigations.

Reporting to the Comptroller are a number of men who are shown upon the second line of the chart.

I will describe first the work done under Mr. Behan, the Assistant Comptroller, whose name appears at the lefthand [fol. 8201] end of the second line. A brief description of the work done in that division is printed upon the chart.

You will notice that my name appears on the next line below, in the second item from the lefthand end. I am in charge of what is known as the Methods Division. The Methods Division prepares the general accounting methods and bookkeeping procedures for the Bell system and revises these methods from time to time in accordance with the latest and best developments, and assists the associated companies in the detailed application to meet their respective requirements. This work is based upon a careful study of existing methods, and requires the services of experts in the several branches. The men that are engaged in this work have been selected by reason of their experience and ability to design accounting methods to meet the changing requirements of the business.

The development of these methods requires close touch with the associated companies through numerous personal visits and conferences as well as other correspondence in order to maintain an intimate knowledge of the developments and requirements in the territory of the various companies. There are over 25,000 different items of material comprised in a telephone plant, the accounting disposition of which each associated operating company is continuously confronted with as a matter of routine work, and there are thousands of other entries relating to payroll, vouchers, revenue, etc., which must be taken into account.

Now, there is a correct, economical and efficient way of [fol. 8202] doing all this work and many incorrect and unsuitable ways. The volume of the work is so great that any betterment effected in accounting treatment results in saving of cost.

The General Supervisor of Methods acts for the Bell companies in the development of accounting methods best adapted to the changing needs of the business. This work is necessarily continuous and it must go on if the results are to be obtained. Based upon our investigations we issue standard printed bulletins which provided routines and

forms with suitable alternative procedures to adapt the fundamentals to varying conditions in different parts of the country.

The General Auditors are in this way enabled to formulate their practices with a minimum of effort, with the assurance that they are modeling their routines upon the latest improved methods.

I skipped the Tax Accountant there in passing to my own name. The principal work of the Tax Accountant is the preparation of the consolidated income tax return for the Bell System.

The items of income and deduction of the associated companies are scrutinized by the Tax Accountant and his assistants, which assures that the companies are not placed at any disadvantage by the frequently complicated provisions of the tax law. We find better results are obtained if the problems arising are presented to a single source of contact with the income tax officials. At the same time the local [fol. 8203] officials are relieved of the time and traveling expenses which would be required if they had to present their own cases in Washington.

The next section is that of Chief Traveling Auditor. As I stated, we make annual audits of all of the Bell System Companies, and we also make numerous audits on what we call methods inspections. These are inspections to see that the most suitable methods continue to be employed.

Passing to the next main division we find the work of the Chief Accountant, Mr. Shaver. Mr. Shaver's work has to do with accounting principles and I can describe that better by means of some exhibits.

In the center of the chart we find the Chief Statistician, Mr. Andrews, and a considerable force reporting to him. I will describe the work by referring to some of the duties of the individuals reporting to Mr. Andrews.

You will notice that there is one sub-heading, "General Economic Statistics." This is worked on by Mr. Richter and several assistants. Mr. Richter was formerly instructor in economics at Harvard. He is in charge of the study of general business conditions and the preparation of various reports and analyses derived from these studies for the benefit of the associated companies. He also makes a special study of financial and investment conditions, upon the basis of which he acts in an advisory capacity to the

officers of the American Company upon questions of assisting the associated companies in financing.

The next sub-section is that of "Graphic Analyses," un- [fol. 8204] der the name of Mr. Richardson. This section has the work of preparing methods of analyzing operating data and devising the best methods of preparing graphical charts. The work of that section is spoken of in our office as "Mak- the account sit up and talk." That is, it is not sufficient to have an accounting system. It is also necessary to use it after you have it. And if you can make the figures sit up and talk and show you really what is going on, you have achieved the real usefulness of the accounting system, and a great deal of very useful work is done in that section.

The next section is that on "Statistical Methods and Mathematical Studies", in charge of Professor Belcher. Professor Belcher is a man of high mathematical attainments, formerly connected with Columbia University and the Sorbonne at Paris. He is in charge of studies of a statistical and accounting nature involving the application of mathematics; for example, depreciation accounting and actuarial analyses of the liability of the companies under the employes benefit plan, the study of fire insurance matters, and so on. He also has charge of the Department of Improved Technical Statistical Methods, including the methods which are used by the associated companies in the preparation of estimates of future operating and financial performances.

The next section, "Statistical Analyses", has to do largely with projections of performances and correlations of development along one line with developments along another line.

Then we have a section of "Personnal and Development [fol. 8205] Statistics." This section records statistically data on telephone matters in the United States which are useful for reference by the associated companies and issues comparative statements. It compiles the employes census of the Bell System in behalf of the associated companies, showing the age, sex, length of service, rates of pay, occupations, etc., of the employes.

It also compiles all necessary data on employes for the Interstate Commerce Commission's annual reports for the Bell System Companies.

We also maintain a large accounting and statistical library in New York, to which the associated companies

make reference. We find that that has considerable value. A great deal of information is available in New York or the near-by eastern cities which is not available in the country generally. We have requests from the associated companies for information, and they say, "We realize that this may put you to considerable trouble, and we don't want you to go to considerable trouble," but very often we know where to lay our hands on the information. The people in charge of the library are familiar with the repositories of statistical data.

The work of Assistant Comptroller Saxon I think is sufficiently explained upon the chart, and Assistant Comptroller Uhrig has charge of the accounts of The American Telephone & Telegraph Company. His position is very much the same as that of a general auditor for one of the associated companies. I think that work is also sufficiently [fol. 8206] described upon the chart. I might mention that there is some auditing work performed in behalf of the associated companies outside of this department; that is the work done by Assistant Vice President Cox, in auditing the Western Electric Company under the contract.

Shall I describe that, or is Mr. Cox to appear?

Q. I think you may describe that. We will probably save time.

A. We found that in checking the Western Electric Company in behalf of the associated companies it was well to have a very high grade specialist on the work. Mr. Cox is a thoroughly efficient telephone engineer and graduate engineer, and at the same time he is a thoroughly competent accountant and acted for quite a length of time as chief accountant for The American Telephone & Telegraph Company.

Q. What do you mean by checking the accounts as between the associated companies and the Western Electric Company?

A. I was about to describe that investigation.

The principal items of work are here; verifying the prices charged for telephone apparatus by the Western Electric Company to be the standard prices to all of the associated companies, so that one company is not treated differently from another; verifying that prices charged for cable, etc., are correct; verifying that percentages or fixed sums chargeable for special services and based on

cost are determined by correct and adequate studies; checking prices charged by Western Electric Company with prices charged by other suppliers for similar and [fol. 8207] equivalent articles, to verify that the associated Bell companies are obtaining the best prices possible and checking the services rendered to see that they are up to the standard and that the standard is improved if possible.

Q. What sort of accounting is in use in the Bell System and how has it been developed, if you know?

A. From the early days of the telephone business the American Telephone & Telegraph Company has developed accounting systems for the use of the associated companies. Systems were issued in 1884, 1891, 1897 and again in 1904, when the growing complexity of the business required close contact between the accountants and the engineers in determining the most suitable methods.

In 1909 the work became still further complex and a quite elaborate systems of accounts, which was found absolutely necessary to install, was made effective January 1, 1910, and that was the system to which I referred when I said that I was brought into the Chicago Bell Telephone Company to install a new system. That system was in use for three years and it probably would have been in use today except that the Interstate Commerce Commission set to work upon an accounting system in 1911 and held very numerous conferences with The American Telephone & Telegraph Company, and issued a system of accounts effective January 1, 1913.

In working on that problem they made a very careful study of all of the possible methods, including the method which was set up in the system which we then had and which was installed in 1910. The Uniform System of Ac- [fol. 8208] counts as finally issued was very similar to the standard A. T. & T. plan, and I think that tests the care with which our system had been prepared and the soundness of the accounting principles which underlie it.

Q. Have you any way of telling how much time was spent in preparing that system by the General Staff for the benefit of the associated companies and the amount of time consumed in conferences and other work with the Interstate Commerce Commission, out of which finally grew the Uniform System of Accounting for Telephone Companies prescribed by the Commission?

A. There were several expert accountants employed continuously on that work for a space of some two years, notwithstanding the fact that we had already issued our own system, because of the insistance of the Interstate Commerce Commission that the thing be very thoroughly and adequately gone over.

Q. That two years you speak of was the period consumed in work with the Interstate Commerce Commission and does not include any of the work done——

A. Since.

Q. By the General Staff prior to that time, and out of which grew the system adopted prior to the system of the Interstate Commerce Commission?

A. That is correct. We also had considerable work in the way of issuing the Uniform System of Accounts in the most desirable form for the use of the Bell companies. We reprinted that system, not of course changing any of the essentials, but elaborating and using our right, under the instructions of the Commission, to subdivide the regroup [fol. 8209] without impairing the integrity of the main accounts.

I am offering in evidence the accounting circular which embodied the result of that work.

Mr. Burr: It may be marked Crunden Exhibit No. 3, and offered in evidence.

And thereupon the circular above referred to was marked for purposes of identification and was offered and admitted in evidence on behalf of The Ohio Bell Telephone Company and is herewith submitted, marked Crunden Exhibit No. 3 and made part hereof.

The Witness: It is called Accounting Circular No. 8.

Mr. Dotson: The system of accounting that you have been describing was developed by the A. T. & T. Company for the purpose of unifying the system of accounting in the best form possible to carry out the system of management and operation which the American Company desired to be observed by the associated companies?

The Witness: Yes, sir, it was done with the idea that there is one best way of doing these things, and that best way was offered to the associated companies. Prior to the adoption of the Uniform System of Accounts the associated companies availed themselves of that system in varying

degrees. Most of them adopted it substantially. I say all of them adopted it substantially, and I think most of them adopted it almost 100 per cent.

[fol. 8210] Mr. Dotson: In view of the Uniform System of Accounting prepared by the Interstate Commerce Commission, it made it compulsory on the part of the American Company and its associated companies to employ the same method of accounting throughout its business.

The Witness: To the extent that the Uniform System of Accounts goes, yes, sir.

Mr. Dotson: Well now, that system has conformed, you say, largely to the system previously prepared and inaugurated by the American Company throughout its associated companies' activities?

The Witness: There is a great deal of resemblance, yes, sir.

Q. Did the work of the General Staff in the matter of Accounting cease with the issuance of the Uniform System of Accounts by the Interstate Commerce Commission, Mr. Crunden?

A. No, sir, the issuance of the Uniform System of Accounts settled the question of fundamental accounting principles, but the preparation of such a system is one thing and the subsequent exposition of the underlying principles and the formulation of proper accounting book treatments for the complex transactions which are constantly presenting themselves is another thing. Almost as soon as the Uniform System of Accounts was issued questions began to come in to The American Telephone & Telegraph Company from the associated companies.

Perhaps I might illustrate it this way. Supposing that a new code of statutes was drawn up by the State of Ohio. [fol. 8211] That might terminate one phase of the work on the part of the lawyers, but it would not cause them to go out of business altogether, I imagine. And it was just the same way with this. All of the questions, or practically all of the questions which arose, had to be taken up with the Interstate Commerce Commission, and the American Telephone & Telegraph Company represented the associated companies in those conferences. That work is still going on as new things arise, and there have been 90 conferences with the Interstate Commerce Commission since 1913 that I know of, and perhaps more.

Q. Now when you speak of conference, do you mean just a visit to Washington wherein some representative of the General Staff called on some representative of the Interstate Commerce Commission and chatted with him for a few moments, or do you mean conferences of some duration?

A. There were some conferences which were very formal and which were called for both the Bell System companies and the Independent Companies, and which lasted for days. There were other conferences which approached the sort of conferences which you just described; that is, it was handled at Washington or at Philadelphia, and I think a few handled in New York and I attended some which were handled in Chicago, which were more or less informal in their nature and had to do with some special phase of the accounting.

Mr. Shuler: The American Company owning all of the stock of these companies, of course, those conferences were really for the benefit of the A. T. & T. as one of the com- [fol. 8212] panies, were they not?

The Witness: Well, in a way, yes.

Mr. Shuler: That is all.

The Witness: Because naturally it was to the interest of the American Telephone & Telegraph Company, as the stockholder, to see that the best methods were used, and it was equally to the interest of the corporation itself, the associated Bell Company, to be placed in the position to have the best method.

I would like to offer, if I may, an accounting circular, No. 12, which relates to this phase of the work, the making effective of the Uniform System of Accounts.

Mr. Burr: It may be marked Crunden Exhibit No. 4, and is offered in evidence.

And thereupon the circular above referred to was marked for purposes of identification and was offered and admitted in evidence on behalf of The Ohio Bell Telephone Company, and is herewith submitted, marked Crunden Exhibit No. 4, and made a part hereof.

Mr. Kinnison: I understand you to say you installed the system of accounts and the cost system of the Western Electric?

The Witness: No, sir, The Chicago Telephone Company.

Mr. Kinnison: Did the A. T. & T. supervise the system of accounting of the Western Electric?

[fol. 8213] The Witness: No, there is a separate accounting and statistical organization in the Western Electric Company and administered by the Western Electric Company officials.

Mr. Kinnison: Does the A. T. & T. organization, your statistical department, have any direct relation to it, any supervisory relation?

The Witness: No, sir.

Mr. Laylin: May I ask a question there, Mr. Burr?

Mr. Burr: Yes, sir, certainly.

Mr. Laylin: You spoke about Mr. Cox and work in connection with the Western Electric Company, verifying of prices of the associate companies of materials, and also the verification of prices of the associated companies compared with the prices to outside parties?

The Witness: Yes, sir.

Mr. Laylin: Did that work of Mr. Cox'- department comprehend any checking of the expenses of the Western Electric Company in connection with the manufacturing of these materials?

The Witness: Where that was involved in the contract it did, yes, sir.

Mr. Laylin: Was that information available, the result of that verdification?

The Witness: Why, you could bring Mr. Cox out here if there was any desirability. It does not touch my phase of the work.

Mr. Kinnison: You refer to manufacturing costs? Mr. Cox would be familiar with manufacturing costs; is that [fol. 8214] what you mean?

The Witness: I think he would be familiar with every phase of the Western Electric contract. His work is, you might say, in behalf of the associated companies. He does there as a specialist what the associated companies no doubt would wish to do for themselves and which they could not do as well because it would need the services of one employ- in each company to do what is done by him.

Mr. Shuler: May I ask a question?

Mr. Burr: Yes, but will you let me interject this remark first?

Mr. Shuler: Yes.

Mr. Burr: In connection with the Western Electric contract the Commission will recall that no question has heretofore been raised in any of the pending exchange rate cases on the subject of that contract and it has been fairly generally conceded I think that the contract and the relationships under it were not in issue in the exchange cases. That is the only reason why we have not called Mr. Cox to come out here and take up the time of the Commission with that phase of the situation.

Mr. Kinnison: I see that they intend to raise it in New York.

Mr. Burr: It has not been raised so far as I know in any particular cases here.

Mr. Shuler: No, it has not been, so far as I know.

Mr. Burr: I may say on that subject, Mr. Kinnison, that the contract was under investigation by the New York [fol. 8215] Commission and received the full approval of the Commission, if I correctly remember the record, and the contract and the relations under it having also been approved by the United States Supreme Court in the so-called Huston case, we have not thought it necessary to take up the time of the Commission and gentlemen with a separate presentation of that matter, and that is why I suggested that Mr. Crunden touch briefly the subject of Mr. Cox'- duties.

Mr. Harshman: May I ask him a question, please.

Mr. Burr: Yes.

Mr. Harshman: Mr. Crunden, does Accounting Circular No. 8 contain all of the instructions that are in force up to date? I notice it is dated January 1st, 1923.

The Witness: There have been changes since that time in the form of supplements. I did not bring them along because I did not wish to carry too many exhibits and confuse this proposition.

Mr. Harshman: How many supplements are there?

The Witness: Eight, I think. I would not say definitely.

Mr. Harshman: I think we should like to have those.

By Mr. Burr:

Q. Are they voluminous?

A. No, they are not voluminous. It simply adds to the number of exhibits on that. Yes, we can furnish them.

Mr. Harshman: Will you furnish them, please?

The Witness: Yes, sir. Will you make a note of that, Mr. Williams, please?

Mr. Shuler: You spoke awhile ago of verifying the con-
[fol. 8216] solidated income returns, I believe?

The Witness: Yes, sir.

Mr. Shuler: There is an advantage in that, is there not, in filing a consolidated return?

The Witness: Yes, I so stated, I thought.

Mr. Shuler: And the A. T. & T. or the American Company being the owner of all the associated companies, of course, it is for its interest to have the consolidated return made, is it not?

Mr. Burr: Just a moment please. It seems to me that we want to keep the record straight here, and that some confusion is likely to occur from the constant reference by counsel to the fact that the American Company is the owner of any one of the associated companies, for example, the Ohio Bell Telephone Company.

Now, the American Company is not the owner of that Company, and it has already been brought out several times that it is the owner of substantially all of the common stock, but only the common stock, of that company. And while I am not trying to correct counsel at all, I'm just trying to have that definitely understood in the record so that we will not be at cross purposes at some later time. I think the record shows somewhere also that there are more than 3000 stockholders in The Ohio Bell Telephone Company, in addition to the American Company as a stockholder.

Mr. Shuler: Preferred stock?

Mr. Burr: Holders of preferred stock, yes.

Mr. Shuler: I thought everybody was familiar with the
[fol. 8217] facts. I do not care to be pettifogging by saying owner rather than owner of the common stock. That is what I mean.

Mr. Burr: Yes.

The Witness: I might mention that the work which resulted in the issuance of the accounting circular No. 12, which is, I believe, Exhibit No. 4, is not work that is special to the telephone business. Precisely the same work was necessary and is necessary in connection with the Uniform System of Accounts for railroads; a similar work has been carried on with the Interstate Commerce Commission in be-

half of the roads by a committee known as the Committee on Corporate Fiscal and General Accounts by the American Association of Railway Accounting Officers. That is a large committee which has numerous sub-committees dealing with various phases of the accounting, and the cost of the work is borne by the individual carriers and is charged to their operating expenses.

Q. Is that a work which is a continuing one?

A. Oh, yes, it is going on now. The Commission is looking forward to revision of the railroad classification of accounts and also of the telephone system which may perhaps be revised in 1925.

Q. Now, right at this point, I recognize that the Commission and probably gentlemen in the room are familiar, at least to a large extent, with the magnitude of this accounting system as applied to the Interstate Commerce Commission's System of Accounting, particularly the one pre- [fol. 8218] scribed for telephone companies. But for the benefit of the record, can you briefly state what is involved in this matter of accounting. Give some idea of the attention paid to it by the Interstate Commerce Commission, the number of the men engaged in the work on the part of the Interstate Commerce Commission, the matter of meetings which are held, the conferences, and, in general, the wide, tremendously wide, scope of the business and the work which it entails?

Mr. Shuler: I object.

Mr. Dotson: It seems to me the question is rather a presuming one.

Mr. Burr: The question is withdrawn. Far be it from me to be presumptuous.

Q. Will you give the number of accounts to which charges and credits are made in the system of accounting prescribed by the Commission for telephone companies?

A. I have never counted them, Mr. Burr, but here is the book which I have just filed as Exhibit No. 3. I think it speaks for itself. It runs to 103 pages and is smeared, vulgarly speaking, with accounts of various kinds.

Q. There are several hundred of them, aren't there?

A. Oh, yes, as kept by the Bell System there are several hundred.

Mr. Dotson: You mean to say that the Exhibit known as No. 4——

The Witness: Exhibit No. 3, Mr. Dotson.

Mr. Dotson: Shows the various accounts which have been worked out by your staff.

[fol. 8219] The Witness: It shows those that are made mandatory by the Uniform System of Accounts, and also those which we have placed in the System in order to best adapt it to the needs of the associated companies.

Mr. Burr: At this point we would like to have identified as Crunden Exhibit No. 5, and offered in evidence, a copy of the Uniform System of Accounts for Telephone Companies prescribed by the Interstate Commerce Commission and referred to by the witness from time to time, with the understanding, if you gentlemen are willing to so agree, that that system has also been adopted and prescribed for telephone companies by the Public Utilities Commission of Ohio.

Mr. Dotson: If that is a fact.

Mr. Burr: I think the Commission will bear me out.

Mr. Dotson: I think the Commission will take judicial notice of its own actions.

Commissioner Poor: I don't think there is any question about that.

The Witness; In this Exhibit No. 4 the questions and answers are sometimes of very great importance and sometimes are comparatively trivial. A very great deal of work and a very great deal of discussion has been put in on some of them. And of course there are others that you could pick out that are not of great importance.

Question 47 says, "To what account should be charged fees and expenses of attorneys other than regular employes of the company engaged in the preparation of legal papers," etc. The answer is, "Account 201, organization." [fol. 8220] I think every accountant would know that.

Mr. Dotson: You mean attorneys fees are unimportant?

The Witness: No, sir, Pardon me for opening it at that particular place, Mr. Dotson. By turning to some of the other questions, for instance Question 39, there is an elaborate question regarding the charges when contractors perform construction work for telephone companies. And again No. 184 is a very important one indeed. It is very simple in its statement, "To what account should be charged

the cost of inventories and appraisal of plant?" But the answer takes up all of the various kinds of inventories and appraisals in detail and shows what should be done under all of the different situations and alternative situations.

The study of that is one requiring numerous conferences with the Interstate Commerce Commission to get settled.

Mr. Dotson: Are you introducing this Exhibit No. 5?

Mr. Burr: Yes, it is offered in evidence. No. 5 we will have to supply. In some of these cases copies of this exhibit already have been offered in evidence. If you gentlemen will indicate how many copies you want—I think you have most of them already—we will supply that.

Mr. Dotson: It is a strange anomaly to be offering that which you haven't got.

Mr. Burr: In order to cooperate with Mr. Dotson in his efforts to keep me straight, we now hand to the stenogra- [fol. 8221] pher Uniform System of Accounts for Telephone Companies as prescribed by the Interstate Commerce Commission. It may be marked for identification as Crunden Exhibit No. 5. There is within the cover of the Exhibit No. 5 a supplement to the first issue, with an introductory letter by the Chief Examiner of Accounts of the Interstate Commerce Commission, and we would like to have it understood that that is included in and is offered as a part of Exhibit No. 5.

And thereupon the document last above referred to, with the Supplement therein contained, was marked for purposes of identification and was offered and admitted in evidence on behalf of The Ohio Bell Telephone Company, and is herewith submitted, marked Crunden Exhibit No, 5 and made part hereof.

Mr. Shuler: You do not mean to say, Mr. Crunden, that accountants from all over the United States did not also go to Washington and work with the System on its System of Accounts, do you?

The Witness: The Independent Companies were represented through a committee, I think. In fact I know some cases where I saw them present. But the associated companies were not represented except through The American Telephone & Telegraph Company, otherwise than that some of the representatives came there as a matter of interest to themselves. For instance, at the time that I was in the

employ of the Chicago Telephone Company, when the hear-
[fol. 8222] ings were held in Chicago, I attended, but the active work was conducted by the General Staff representatives of the A. T. & T. who were more thoroughly competent to take up the matters.

Q. Now, you speak of hearings on that subject; hearings were held by the Interstate Commerce Commission, were they not?

A. Yes.

Q. And long hearings?

A. I said some of them were long, lasted several days; others were short.

Q. Yes. Do you know anything of the size of the department of the Interstate Commerce Commission which has to do with the Uniform System of Accounts?

Mr. Shuler: What is the purpose of prolonging this with questions like that, which are certainly not competent?

Mr. Burr: The question is withdrawn. I do not think it is important.

Q. Is it still necessary from time to time to get the consent of the Interstate Commerce Commission in these matters of accounting?

A. Oh yes, and will be.

Q. To what extent is your department in communication with the Interstate Commerce Commission and working on these matters?

A. We have very frequently to make trips to Washington to discuss questions which have been raised by the associated company's general auditors and get decisions on doubtful points.

Mr. Kinnison: It is purely an interpretation of that which in its nature amounts to a Federal Law.

[fol. 8223] The Witness: Yes. It is the fact that it amounts to a Federal Law that makes the thing of such great importance.

Mr. Kinnison: Your trips there are simply to secure an interpretation of the existing law?

The Witness: Yes.

Q. Is one of the subjects which has to be taken up from time to time with the Interstate Commerce Commission that of depreciation?

A. Yes, sir, that is one subject.

Q. We will come to that a little later on, but that is one of the very large subjects, isn't it?

A. At the present time it is one of the most active subjects. A great deal of work is being done on it.

Q. Does your department also do any work on the same subject?

A. Unfortunately we are very much involved in that, yes, sir.

Q. You say unfortunately. You mean from the standpoint of time involved?

A. I speak with personal feeling about the subject, yes, sir.

Q. Tell the Commission whether the Interstate Commerce Commission requires periodical accounting reports from the associated companies and what the Staff of the American Company has done with regard to such reports?

A. The Interstate Commerce Commission requires the filing of monthly and annual reports on the part of these companies. The monthly reports are comparatively simple documents. The annual report is very broad. Of course, the Commission knows that because a copy of it is filed here. [fol. 8224] Q. Let us see about that for a minute, You say the monthly report is a comparatively simple one. How many pages are there in the report for a company such as The Ohio Bell Telephone Company?

A. For the Ohio Bell?

Q. Yes.

A. It is one sheet very closely written on both sides.

Q. The report has to do in general with what subjects?

A. Plant—the monthly report?

Q. Yes.

A. The plant, stations, revenues, expenses, income.

Q. Could you give the Commission some idea of the size and extent of the annual report which is made up for the associated company and sent to the Interstate Commerce Commission?

Mr. Kinnison: It is a part of the Commission's report on file here, isn't it? We think it speaks for itself. I understood the witness to say it is on file here.

The Witness: Yes, sir, that is my understanding.

Mr. Burr: I think he can say how many pages are in it and the general scope of it without encumbering the record with a copy of the report.

The Witness: The general scope of it is very great. It is a sort of an accounting dragnet that goes through the whole system and it is designed to disclose anything that requires looking into and it requires quite a little time for preparation. The usual plan in the Bell System is for the associated company to make up a tentative copy of this report and forward it to our office in New York where we go [fol. 8225] over it carefully and see if there is any way in which we can improve it or if there are any respects in which it is incorrect or fails to comply with the desires of the Commission, and we then return it to the associated company without suggestions, which they can adopt or not adopt as they see fit. The result of that method of procedure has been that the inquiries coming from the Commission to the associated companies with respect to the annual reports have been very limited and unimportant. Our reports down there are in very good shape and show very few corrections. It is the custom of the Commission in reporting changes to require that the changes be made on the original sworn report, and it is quite possible to find down there annual reports on file which have been changed so radically that it is quite a reflection on the men that prepared them. But I am happy to say that you won't find that situation for any of the Bell System companies.

Mr. Shuler: May I ask a question there, Mr. Burr?

Mr. Burr: Yes.

Mr. Shuler: Are you familiar with those reports that are filed monthly by the various telephone companies?

The Witness: Yes, sir.

Mr. Shuler: Both Bell and Independent?

The Witness: No, sir, with the contents of them do you mean or the form?

Mr. Shuler: No, the contents.

The Witness: No, no, I am not familiar with the contents; that is, they change from month to month.

[fol. 8226] Mr. Shuler: But those reports are made out so as to show the revenue and expense of the company, are they not?

The Witness: Yes, sir.

Mr. Shuler: And they will show the operating costs of the Bell Companies and of the Independent Companies?

The Witness: Yes, in what might be called tabloid form, yes, that is true.

Mr. Shuler: It will show the per station cost of all the companies, will it not?

The Witness: The number of stations is shown there, but I don't recall for the moment positively whether the per station comparisons are introduced in those reports.

Mr. Shuler: Those reports are reliable, are they not?

The Witness: I hope so. Ours are certainly reliable.

Mr. Dotson: The work of the General Staff on the annual reports simply consists after all of a check-up of the reports as prepared and submitted by the associated companies for the purpose of ascertaining whether any incorrections or not are contained and to verify the correctness of them before they are sent in to the Interstate Commerce Commission?

The Witness: That is it, yes, sir. And in addition we have in New York a centralized bureau containing a whole lot of bookkeeping and tabulating machinery for making [fol. 8227] up the rather complicated report to the Interstate Commerce Commission respecting employes and their wages.

Mr. Shuler: Do you keep a duplicate copy of these reports from each associated company on file in the New York office?

The Witness: Yes, I think we do, sir.

Mr. Kimison: Are these monthly reports necessary other than in a consolidated annual report; that is to say, each of these companies operating as a separate entity, or will they assist in compiling the separate monthly reports as well as the annual reports?

The Witness: They would.

Q. Has the Interstate Commerce Commission promulgated any accounting or statistical methods for telephone accounting?

A. No, Mr. Burr, they have not. They have told us what we have to do but they have not told us how we have to do it. It is necessary for the telephone companies to determine their own best methods of carrying out the instructions of the Interstate Commerce Commission.

Q. Has that Department undertaken to do that for the associated companies?

A. It has.

Q. Have you an exhibit showing the accounting bulletin estimate routine?

A. I have.

Mr. Burr: It may be marked Crunden Exhibit No. 6, and is offered in evidence.

And thereupon the routine bulletin above referred to was marked for purposes of identification and was offered and [fol. 8228] admitted in evidence on behalf of The Ohio Bell Telephone Company and is herewith submitted, marked Crunden Exhibit No. 6 and made part hereof.

Mr. Shuler: At this point may I get some information?

Mr. Burr: If we can give it to you.

Mr. Shuler: I will ask, Mr. Crunden, in consolidating the income reports, isn't the party filing permitted to deduct from large gains of one company deficits of another?

The Witness: I am not in touch with that phase of the work and I would have to defer to a lawyer like yourself.

Mr. Shuler: I am not a lawyer on income tax returns.

The Witness: Well, I know the thing is more or less a specialty and that is why we have a man that does nothing else, but I really could not tell you about those tax reports.

Mr. Kinnison: Does the A. T. & T. file an annual report?

The Witness: With the Interstate Commerce Commission?

Mr. Kinnison: Yes.

The Witness: Yes, sir.

Mr. Kinnison: Do you file here?

The Witness: I think not.

Mr. Dotson: What does that income report include? What source of income, if you know?

[fol. 8229] The Witness: I have not seen the reports for years but it is my recollection it is filled out on the same forms as the ordinary annual report of telephone companies, additional sheets being inserts where the character of the work is so different that the forms are unsuitable.

Mr. Dotson: Do you know the various sources of revenue that are reported by the American Company?

The Witness: To the Interstate Commerce Commission?

Mr. Dotson: Yes. For instance, on the associated companies, do they report any other revenue than the license revenue?

The Witness: In their revenues?

Mr. Dotson: Yes.

The Witness: Yes, they report the revenues from the toll operation of the Long Distance Lines Department, and their income from interest on money that they advanced to the associated companies. In fact it would show all of their revenues from every source.

Mr. Dotson: Does that include the Western Electric revenues from the Western Electric?

The Witness: Yes, it would include the revenues from Western Electric, yes.

Mr. Dotson: What is the nature of those revenues?

The Witness: The A. T. & T. Company owns a large proportion of the stock; in fact I think it owns practically all of the stock of the Western Electric and receives a dividend, and that would be shown in that report.

Mr. Dotson: Would that same fact hold true with reference to the associated companies if they earned dividends? [fol. 8230] The Witness: Yes.

Mr. Shuler: Does the A. T. & T. file an annual report before this Commission of the revenues of intrastate Long Lines business in this state?

The Witness: I don't know. I am not familiar with that, sir.

By Mr. Burr:

Q. Mr. Crunden, is the compilation which is labeled Standard Estimate Routine Bell Telephone System, October 1, 1920 which has been marked Crunden Exhibit No. 6, the one to which you have referred as Accounting Bulletin Estimate Routine?

A. It is, yes, sir, and it is the work of my particular subdepartment; that is, it is issued by the General Staff and it is quite an elaborate bulletin. I do not offer it as an illustration of every bulletin we put out. It is an illustration of one of our more important bulletins. This goes into every phase of the accounting for construction and removals and rearrangements and changes of plant in connection therewith, and it is a very carefully studied publication. It was worked on for two years before it was issued and tied up several men almost exclusively.

It first of all contains a text showing what we consider is the best, most economical and most efficient method of handling these matters, and then follows with suggested forms, which the associated companies can either use as

they stand or can modify according to their requirements. It then goes into the question of plant records necessary [fol. 8231] in connection with such work and shows the best way of exposing information regarding the plant to be added and retired, with blueprints and other graphical representations. It then goes over into the accounting department and shows the manner of keeping the records of labor and material, etc., and of summarizing them most expeditiously.

Q. Was Exhibit No. 6 prepared at all by the Interstate Commerce Commission?

A. No, sir, the Interstate Commerce Commission does no work of this character at all. The only estimate that I know of that it ever made out was that it suggested a few very simple matters for the very tiny Class C companies, and they only did that because they were forced to.

Q. How is this routine kept up to date?

A. It would be kept up to date by means of supplements issued from time to time, and when the supplements had accumulated to where they represented any substantial part of the routine we would reprint it.

Q. Are you at work on the matter all of the time?

A. Yes, we have done much work on that bulletin since it was issued for the reason that it was issued comparatively recently, and it still represents our best thoughts upon the subject. But the trouble is that it won't stay put, so to speak. We shall have to change it undoubtedly with the changing conditions of the business.

Q. I notice that this routine Exhibit 6 supersedes and cancels a previous one, Accounting Bulletin 4B, dated August 10, 1917, was there effective prior to that date a routine something similar to this one?

A. Yes, sir.

[fol. 8232] Q. Prior to that time had there been other routines in effect?

A. Yes. The preceding routines were not as carefully thought out and as good as this. The work develops progressively.

Mr. Dotson: What are the most primary changes which the latest bulletins carry from the former bulletin?

The Witness: It provides suitable records for showing the plant that is handled under these so-called estimates, and it also has a very good method of accounting for the

expenditures in the office of the plant accountant; that is the office down near the job. It also has a very good plan for controlling the expenditures by means of an annual budget and it ties in all of these expenditures with the annual budget under which the associated company is controlling its expenditures.

May I interject a word here about that work "Estimate Routine"?

Q. If you please.

A. In the first place, the routine is usually thought of as some comparatively simple procedure that runs among semi-automatically after you have shown some cub how to carry it through. But this is on a very extensive scale.

Q. That is this routine you are now referring to, Exhibit 6?

A. Yes, it covers every phase of the work and it amounts to detailed instructions with alternative procedure in many cases, so that the term routine is a comparatively light term to apply to such a document.

I perhaps ought also to say that we use the word estimate [fol. 8233] there in more or less of an unusual sense. That does not imply that the figures as finally carried on our books are estimates. That is what I want to be sure is understood. Our plan is not to undertake any work of any consequence at all unless the thing has been properly thought out and put down in black and white and approved by responsible officers. And those authorities to take the work we call estimates, and that is how the term estimate routine develops.

Mr. Dotson: Are we to understand that in the latest bulletin the principal changes are in a more detailed elaboration of instructions, specific instructions, carrying with it alternative ways that may be followed that constitute the principal changes from the——

The Witness: The fundamental idea that is in this bulletin was in its predecessor. Is that the kind of answer you wanted?

Mr. Dotson: That partially answers it. What I mean is that the fundamentals of the present system disclosed by this exhibit were carried in the former, but you elaborated them more in this last instruction pamphlet which was sent out so as to make sure that they would be carried out more completely by the various associated companies?

The Witness: Yes. That does not mean that we necessarily added details. It means we have gone more into detail as to the best method of doing the work and we have adapted the fundamental idea to the business as the business progresses. That is characteristic of a whole lot of our [fol. 8234] work. We feel that in accounting we are on the right track in a great many things, but we — continually improving that track.

Mr. Harshman: Mr. Crunden, is Exhibit No. 6, including the instructions recommended by the General Staff, for use of associated companies with reference to the budget system?

The Witness: It does not carry the budget system, in itself, but it is designed to fit in with the system, of budgetary control of the associated companies.

Mr. Harshman: Could you furnish the circular, or whatever you have, with reference to the budget system of the associated companies?

The Witness: I don't think we have any circular on that.

Mr. Harshman: You have no circular?

The Witness: No.

Mr. Harshman: Is it covered in any printed matter at all?

The Witness: I am fairly confident it is not. I don't remember any at all.

Mr. Kinnison: Does the Ohio Telephone & Tele*phone* Company join in on your consolidated report as an operating company, or is it simply a real estate holding company in Ohio?

The Witness: Just simply as a what? As a real estate holding company?

[fol. 8235] Mr. Kinnison: Yes, or is the title to the real estate held by the A. T. & T. Company in Ohio?

The Witness: There isn't any doubt in my mind, although I of course obviously am not a lawyer, that the property operated by the Ohio Bell belongs to it and is operated as its property.

Mr. Kinnison: Does The American Telephone & Telegraph Company own any property in Ohio or has it organized a separate company for the purpose of holding this property in Ohio? I am speaking of the Long Lines?

The Witness: I don't know, sir.

Mr. Kinnison: You do not?

The Witness: No, sir.

Q. Have you an exhibit on the subject of Station Equipment?

A. Yes, I have.

Mr. Burr: It may be marked Crunden Exhibit No. 7, and is offered in evidence.

And thereupon the document last above referred to is marked for identification and is offered and admitted on behalf of The Ohio Bell Telephone Company, and is herewith submitted, marked Crunden Exhibit No. 7, and made part hereof.

Q. Will you explain the Exhibit?

A. This exhibit may very well be offered as a representative of one of our smaller standard routines. It has to do with a special phase of the accounting, namely, accounting [fol. 8236] for station equipment. It has principal reference to Account No. 607 of the Uniform System of Accounts, which is shown on page 88 of Exhibit No. 3. The text on page 88 is very limited and comprehensive—is very limited but comprehensive, I suppose I should say, but additional interpretation and analysis is necessary.

Now, this bulletin, composed of several pages, a little over five pages, shows what is really required by the instructions of the Interstate Commerce Commission on page 88, and it provides suitable accounts for recording the various kinds of information which are embodied in Account 607, station removals and changes.

You will find the sub-accounts recommended by the A. T. & T. Company on page 4 of this bulletin and I believe that the Ohio Bell Company are keeping practically all or all of those sub-accounts, and all or practically all of them are necessary.

Q. To what extent is this Exhibit No. 7 supplemented by further work on the same exhibit by the General Staff?

A. We issue additional memorandum on bulletins of this sort from time to time whenever there is any change in the conditions.

Mr. Dotson: There has been no change made from the system published in this bulletin since that date?

The Witness: No substantial change, no; just minor changes.

Q. Have you one regarding the matter of Measured Service Billing?

A. Yes, I have; that illustrates another phase of our [fol. 8237] work.

Mr. Burt: It may be marked Crunden Exhibit No: 8, and is offered in evidence.

And thereupon the document last above referred to is marked for purposes of identification and is offered and admitted in evidence on behalf of the Ohio Bell Telephone Company and is herewith submitted, marked Crunden Exhibit No. 8, and made part hereof.

Q. To what extent if at all do the experts of your departments make visits to the associated companies in connection with the installation of these routines?

A. Should I say anything about this last exhibit at all, or would it speak for itself? I think it does speak for itself. I can say all I want to say very briefly; that is, that this Bulletin relates to measured service records and measured service billing, and it is in the form of a letter. That is the form in which we usually issue advices when they pertain to some special work rather than to the accounting in general.

Q. You are now referring to Crunden Exhibit No. 8?

A. Yes. Measured service is furnished usually in the larger cities; consequently the issuance of this bulletin would not apply as a country-wide proposition to all exchanges, but nevertheless it is a valuable bulletin in the handling of measured service billing because it shows the result of our study of the best way of handling that work. You can spend a lot of money on measured service, billing [fol. 8238] due to the great number of items that have to be accounted for, and it is very essential when the total revenue per call is low that the method of accounting should be stripped down to the absolute minimum and to the most economical basis possible. At the same time the work should be done in such a way that the employes do not become dissatisfied with the work in your attempted to achieve the utmost economy.

Q. You were going to discuss Exhibit No. 7, Station Equipment?

A. Oh, I did.

Q. You had finished that?

A. I had finished on that.

(Previous question read as follows: "Q. To what extent, if at all, do the experts of your departments make visits to

the associated companies in connection with the installation of these routines?")

The Witness: We make frequent visits to the associated companies; we necessarily must keep in touch with the work, with the business changes, and our men in New York could not keep up to date unless they went out into the field and were very closely in touch with the field. We have made numerous visits to Ohio of recent date and done considerable work here as we have pretty generally throughout the country; for example, taking some of the more important matters, in October and November, 1921, Mr. Van Zandt of our Staff visited Ohio and stayed one month in connection with the consolidation of the Ohio Bell and the Ohio State Telephone Company plants. At the time of the consolidation the plant investment of the Ohio Bell Company was [fol. 8239] distributed over the primary plant accounts in conformity with the Interstate Commerce Commission accounting regulations, but only a minor portion of the investment of the Ohio State was so distributed. The greater part of the investment of the Ohio State, including the plant acquired on the date of its organization, which I think we back in 1914, and several important telephone companies which it had acquired since that time, were carried in one general account. It was therefore necessary for some one who had the necessary detachment from other duties and the necessary competency to go to work and devise some means of distributing the plant investment over the primary plant accounts so that the investment of the two companies after consolidation could be stated on similar bases.

For this purpose study was made of the Ohio State Company plant back to the date of the organization, including the purchase of the several properties since that date. The inventories and appraisals of portions of the property which had been made from time to time were reviewed and were brought up to date by adding thereto net additions to plant since the dates of the various inventories. This revised appraisal was then used as a means of distributing to the primary accounts the book investment in plant.

Q. That was all done by a representative of the General Staff working in Ohio?

A. Yes, sir; Mr. Van Zandt is a former examiner of the Interstate Commerce Commission, of long experience, and he was also an accountant for the Federal Telephone Ad-

[fol. 8240] ministration under the Postoffice Department during the war.

Mr. Kinnison: Did I understand you to use the words "book investment?"

The Witness: Yes, sir. That is, you have to place the book figures. You cannot change them and turn them into value figures or anything like that.

Mr. Kinnison: You speak of the inventory being brought down to date and additions and betterments and then setting up book investment?

The Witness: Yes, sir, the redistribution of the investment which Mr. Van Zandt made was transferred to the Interstate Commerce Commission, and upon receipt of the necessary approval of that body the adjustments were made in the accounts. Mr. Van Zandt made three visits to Washington for conferences on that matter to secure the approval of the Commission for the Ohio Bell Telephone Company.

Mr. Kinnison: Now you spoke about your study of plant investment back through the years and you brought it down to date and made such changes as were necessary. In what particular would the plant investment account which had been kept during the years down to 1921 require any changes or readjustments, if such is the case?

The Witness: It was carried, as I stated, in one undivided sum, in one lump. That afforded no data for proper displacements of the various component parts nor for the proper treatment of depreciation nor anything that required analysis of plant accounts.

[fol. 8241] Mr. Kinnison: Where was this account kept? In the A. T. & T. office—that you are speaking of?

The Witness: The Ohio State?

Mr. Kinnison: Yes.

The Witness: No, it was kept on the old Ohio State Company's books which were turned over to us—I don't know whether they were permanently turned over to us, but they were placed at our disposal.

Q. I don't know whether Mr. Kinnison understood you or misunderstood you in answer to one of his questions. You don't want the Commission to understand that when this adjustment of book accounts was made the Ohio State Telephone Company's properties were put on the books of

The Ohio Bell Telephone Company at some appraised values that had been placed on the property?

A. No, I thought I made that clear.

Mr. Kinnison: What did you mean then?

The Witness: I mean that the book accounts of the two companies, at least as to their plant, were merged but that the Ohio Bell Company's plant was already kept in the proper detail, and with the proper sub-classifications to conform to the Interstate Commerce Commission accounting, whereas the Ohio State Telephone Company plant was not, and from the standpoint of good accounting it was necessary that that separation should be made and be made correctly so that the two accounts could be merged and thereafter treated as one account.

Mr. Dotson: That accounting study was made to make the adjustment you speak of for the purpose of a basis and [fol. 8242] means of determining the value of the plant, in concluding the purchase of it?

The Witness: No, sir, it had nothing to do with the value of the plant or nothing to do with the purchase of the plant. It was entirely an accounting matter and it had to do with getting the figures into the correct form under the Uniform State of Accounts to insure plant retirements being made in the proper way in ordinary routine and also to provide necessary data for determining the legal depreciation rates.

Mr. Kinnison: In setting up property values did you go to the records of the Ohio State Company or did you independently attempt to solve that?

The Witness: I did not do this work myself. I am telling you in a general way so much as I know of what Mr. Van Zandt did and that it involved one month's time on his part and two trips to Washington. But generally speaking it was a proposition of consolidating books figures and the value figure did not get into it.

Mr. Dotson: Well, the depreciation account—such an account was kept by the Ohio State Company?

The Witness: I have no doubt it was. I have no personal familiarity with their books.

Mr. Dotson: But the depreciation account differed from the Bell account in matter of rate of depreciation, did it not?

The Witness: I could not say. I am not familiar with their books, Mr. Dotson.

[fol. 8243] Mr. Dotson: In the study of the depreciation account of the Ohio State, was that revamped so as to conform to the rate of depreciation that had been followed by the Bell Company through the years?

The Witness: I could not say, sir.

Commissioner Poor: Mr. Crunden, do you mean that the Ohio State carried their plant account as a plant account in an entirety and it was not divided up so as to show how much went, for instance, to buildings, or how much to station equipment?

The Witness: Yes, sir, except as to certain additions made after a date that is unknown to me.

Commissioner Poor: This work that Mr. Van Zandt did was to take the total and to allocate it into the proper subdivisions?

The Witness: Yes, sir.

Commissioner Poor: So as to show what amount of that total should go to the plant accounting, building, station equipment, toll lines, etc.

The Witness: Yes, sir, he did that in such a way that he was able to obtain the approval of the accounts of the Interstate Commerce Commission.

Commissioner Poor: So that the whole of these subdivisions equalled the total as carried by the Ohio State?

The Witness: Exactly.

Mr. Dotson: You got that information from the records kept by the Ohio State Company, did you not?

[fol. 8244] The Witness: Well, as I say, Mr. Dotson, I did not perform this job myself and I am just generally familiar with it. I know that this service was performed, but the exact work undertaken by Mr. Van Zandt and what his negotiations with the Interstate Commerce Commission involved I do not know; but unquestionably that is in the possession of the auditor of The Ohio Bell Telephone Company and could be readily ascertained.

Mr. Dotson: Do you know of any company of the magnitude of the Ohio State that failed to carry its property account in any other way than in sufficient detail to show the various kinds of property allocated to the various subdivisions due to the nature and character of the property?

The Witness: Well, there you have a question that I cannot answer from lack of familiarity with the subject. I am not familiar with the books of the independent companies. I do not study their reports. In any case their annual re-

ports are too condensed to show whether or not they do keep such information.

Mr. Dotson: Well, they might keep it so far as you know? You are speaking now and answering me on the ground that your work has not enabled you to become familiar with their system of accounting to enable you to know whether they did or not?

The Witness: Precisely so, yes, sir.

Q. Now, you had only gotten as far as Mr. Van Zandt's study?

A. Yes, I was about to refer to another item of work that [fol. 8245] we performed. At the request of the General Auditor of The Ohio Bell Telephone Company we sent two experienced methods specialists to Ohio who worked between April and November, 1921, on a new set of administrative accounting routines made desirable by the change in organization and the progressive change in business—in the telephone business generally—in Ohio.

Q. During how much of that period were those men in Ohio?

A. One of them, Mr. Schultz, who is an expert on plant account, was in Ohio for a total of 130 days, and he was working continuously on the Ohio Bell work during that time. Unfortunately for me, Mr. Schultz made so favorable an impression on the people in Ohio that they asked to have him transferred from the A. T. & T. staff to their staff, which we agreed to do, and he is now Plant Accountant of The Ohio Bell Telephone Company. The other gentleman, Mr. Ohlander, spent 72 days working on other phases of the same general subject. These men worked out administrative accounting routines, of which I have copies if you would like to have them filed.

Q. You have spoken of these particular cases. Those do not represent all of the visits made by your experts to the Ohio Bell Telephone Company?

A. No. For example, in December and January, 1922 and 1923, Mr. Schmid, one of our men, made a methods inspection in Ohio which lasted six weeks and his work was embodied in a report containing a number of recommendations, which was sent to the General Auditor of the Ohio Bell Company.

[fol. 8246] Again, in February, May and June, 1923, another of our men, Mr. Bashan—Mr. Bashan is an expert in

clerical procedures and particularly with reference to revenue accounting matters—visited all of the revenue accounting centers of the Ohio Bell Telephone Company during a period of six weeks, going to Cleveland, Akron, Toledo and Columbus and made a number of suggestions for improvements and economy. His work resulted in a reduction in the Staff. But how many people it was I fail to recall.

Q. You mean in the Staff of the Ohio Company?

A. Of the Ohio Company, yes.

Mr. Burr: Now you may go back, if you please, to the exhibit on Administrative Accounting. It may be marked for identification Crunden Exhibit No. 9.

And thereupon the document last above referred to was marked for purposes of identification as Crunden Exhibit No. 9.

The Witness: This exhibit consists of a group of separate documents which I have enclosed with a rubber band. I don't know whethere that is a formal way of doing it. Shall I file them as separate exhibits or read the titles under one exhibit?

Q. Suppose you read the titles and if it may be understood that way, I offer them as one Exhibit?

A. Could we make it exhibit such a- number- a, b, c, d?

[fol. 8247] Q. Yes.

A. Now Exhibit 9a will be Accounting Bulletin No. 7; Exhibit 9b will be Accounting Bulletin No. 9; Exhibit 9c will be Accounting Bulletin No. 11; Exhibit 9d will be Accounting Bulletin No. 13; Exhibit 9e will be Plant Accounting Bulletin No. 5, Section 1; Exhibit 9f will be Plant Accounting Bulletin No. 6; and the last, Exhibit 9g will be Plant Accounting Bulletin No. 7.

Mr. Burr: We offer Crunden Exhibit No. 9, Bulletins a to g inclusive, in evidence.

And thereupon the bulletins above referred to are offered and admitted in evidence on behalf of The Ohio Bell Telephone Company and are herewith submitted, marked Crunden Exhibit No. 9, Bulletins a, b, c, d, e, f and g, and made parts hereof.

Mr. Kinnison: What does "A" refer to?

The Witness: They are administrative accounting routines covering the handling of payroll, sundry disburse-

ments, freight and cartage and all kinds of plant accounting.

Mr. Kinnison: Bulletins issued by your department to the associated companies?

The Witness: No, they represent routines which ordinarily the Ohio Bell people would write themselves, taking [fol. 8248] their information from the standard methods which we turn out and from their knowledge of the field conditions, but whenever the general auditors of the associated companies are oppressed by the quantity of work which they have we are perfectly willing to send out our men to tide them over those emergencies and help them in writing up routines and instructions.

Q. Did you do that?

A. Oh yes, this was a case in point.

Mr. Shuler: Of helping?

The Witness: Of helping, did you say?

Mr. Shuler: Yes.

The Witness: Yes, sir.

Mr. Shuler: You were just helping them out?

The Witness: The help in this case amounted to doing the work. These routines were written by Messrs. Schultz and Ohlander, conferring with the local accounting men and obtaining their approval for all of the suggested procedure. These bulletins are not accompanied by the forms. There were a large number of forms designed in connection with them and to save space I did not bring those along.

Q. Have you an exhibit on the stub plan of revenue accounting?

A. Yes, sir.

Mr. Burr: It may be marked Exhibit No. 10 and we offer it in evidence.

[fol. 8249] And thereupon the document last above referred to was marked for identification, and was offered and admitted in evidence on behalf of The Ohio Bell Telephone Company, and is herewith submitted, marked Crunden Exhibit No. 10, and made a part hereof.

And thereupon a recess was had until 1:30 o'clock P. M. of same day (Thursday, February 28th, 1924).

[fol. 8250] Thursday Afternoon Session

February 28th, 1924.

And also A. B. CRUNDEN, resuming the stand for further direct examination, continued his testimony as follows:

Examined by Mr. Burr:

Q. Mr. Crunden, at the close of the morning session you had testified and there had been introduced in evidence Crunden Exhibit No. 10, which is the stub plan of revenue accounting. Will you describe the plan to the Commission?

A. The distinctive feature of the stub plan of revenue accounting is an additional stub, which remains attached to the subscriber's bill during the billing process, in the accounting department of the Telephone Company, and which is detached when the bill is released being retained as the company's account with the subscriber in lieu of the customary ledger sheet. The stub plan is an ingenious one, it is economical, it furnishes relief during the monthly peak period of revenue accounting, and it simplifies the labor, so that greater production and accuracy are realized.

Q. Can you tell us anything with respect to the savings accomplished by the plan?

A. When we initially developed the plan back in 1921 we made careful studies to find what the savings would be, and found that in the average area having principally flat [fol. 8251] rate accounts and a fair proportion of measured service accounts, that the saving would be about twelve cents per station per annum, so that in a company having say a half a million stations, the saving would be about $60,000 per annum. We have reports on file in New York from areas where the stub plan has been entirely installed and is now running smoothly that those savings have been realized.

Mr. Dotson: Is that the labor saving?

The Witness: It is a labor saving and partly a stationery saving.

Mr. Dotson: Partly stationery?

The Witness: Yes, but that is a minor part of it. The principal saving is in the labor.

Mr. Dotson: It did not affect the method of accounting that was covered by the use of this stationery in any way?

The Witness: No, it achieved the aim of the revenue accounting in accounting for the service in the bills with the subscriber in an equally satisfactory manner—in fact in a better manner.

Mr. Shuler: Mr. Crunden, can you bring us the reports of any one Bell Company for two years which will show that they actually made this $60,000 saving according to their reports?

The Witness: I am basing the $60,000 saving on a calculation affecting 500,000 stations as an average.

Mr. Dotson: A theoretical saving?

The Witness: It is an actual saving, but applied to a [fol. 8252] theoretical 500,000 stations. I do not think we have any reports on file in New York about that. I think that is developed by my people going out and by conversations that I and others have had with the general Auditors of the companies, as, for example, I might give you an illustration of that. I might say that Mr. Booth, of the Michigan Company, told me that the plan was saving at that rate in his company.

Mr. Shuler: That is hearsay.

The Witness: In the Michigan State Telephone Company. It is such things as that that justify us in developing these plans and giving them to the companies.

Mr. Dotson: In what way does the stub system do away with the individual subscriber's ledger?

The Witness: The old plan, Mr. Dotson, was to have a large ledger in which you placed the telephone numbers in serial order or perhaps the names of the subscribers in alphabetical order, and then opposite that you placed the exchange and toll charges each month and carried a running record. Those books were necessarily large and——

Mr. Dotson: That page carried a monthly account, did it?

The Witness: No, each page would carry a certain number of month's accounts serially and would contain the records of several subscribers. Now, the distinctive feature of this plan is that when you print the bill you print with it an additional stub, which is integral with the piece of paper, with the bill at the same time it is printed, and as [fol. 8253] you place the information on the subscriber's bill itself you also place it on the stub. At the proper time you then detach the stub and it serves you in lieu of a

ledger. In other words, we have no ledger with the subscriber today.

Mr. Dotson: You file the original stub away then as the record of the transaction.

The Witness: We file it away when reference to it has ceased. We use it in the bookkeeping process as long as there is any necessity in balancing, posting the cash and disposing of the account. But ultimately we file it away in lieu of the ledger.

Mr. Harshman: When did this go into effect?

The Witness: In January—I could not tell you the date offhand.

Mr. Kinnison: How do you know when you saved twelve cent a year per subscriber?

The Witness: That is based on our studies as to the actual time involved on the part of the clerks and addressograph people and others that have been actually doing the work under the one plan and the other.

Mr. Kinnison: Did you ever see it reduced to an actuality in the records of the company?

The Witness: As I say this work is done by my subordinate and men reporting to me and they thoroughly satisfied themselves in regard to these savings.

Mr. Kinnison: They have assumed certain typical cases and taken this twelve cents per saving.

[fol. 8254] The Witness: Yes.

Mr. Kinnison: They have never seen it worked out on the books of the company as a saving.

The Witness: When you introduce the stub plan, providing that there are no other circumstances to affect it, you can see a gradual descent in the expenses.

Mr. Shuler: Mr. Crunden, you never put the thing in operation in any associated Bell Company?

The Witness: Yes, sir.

Mr. Crunden: And saw the results among its employees?

The Witness: Yes.

Mr. Shuler: Give us that date.

The Witness: I cannot give that to you now.

Mr. Shuler: I want you to furnish that date and tell me what company it was.

The Witness: Well, the stub plan is now effective in practically all or all—I am not quite certain—of the Bell system companies today.

Mr. Shuler: Is it in Cleveland?

The Witness: Oh, yes.

Mr. Shuler: For how long?

The Witness: I think since the latter part of 1921; if not, the early part of 1922. And my men have been repeatedly to Cleveland in connection with this plan, and Mr. Bashant's visit of which I spoke was partly in connection with that matter, and in inspecting the installation they had made and making suggestions for its improvement [fol. 8255] and getting the utmost advantage of it.

Mr. Kinnison: You do not know yourself if that saving has actually developed in the cost of operating the company, do you?

The Witness: The Ohio Bell Company?

Mr. Kinnison: Yes.

The Witness: I cannot pin it down to twelve cents, but I am morally satisfied——

Mr. Kinnison: No, no.

Mr. Shuler: We don't want your moral satisfaction. We want facts.

Mr. Burr: When you jump at him, jump at him one at a time, not all at once.

Mr. Kinnison: We do not want to be discourteous.

Mr. Burr: I know you do not.

The Witness: You know when we determine on a plan of this kind we submit it to the associated company. The associated company examines it, and may decide it is a good plan to install. If it is, they install it. If they need assistance from us in installing the plan, we provide the assistance. Then we go away and leave it. At a later date, at their request almost invariably, but sometimes if we think it is desirable, we make an inspection. We inspect the installation of such a system to see that the fullest advantage is being realized from it, because by inspecting the installations of the same sort of routine in various parts of the country, you get a pretty good idea of [fol. 8256] all its adaptabilities. You see it in those various offices. From that time on our duty ceases and the actual financial results of the thing are available to the local general auditor. But as long as we know that the thing has proved in and made a saving, we would not carry in our heads the exact amount of saving.

Mr. Kinnison: But you have no actual basis for your statement then, have you?

The Witness: Oh, yes.

Mr. Kinnison: What is it?

The Witness: As I say it is based on the studies that we made as to how it would prove in at the time we studied the plan.

Q. What do you mean, "The difference of time between entering on the stub and on the ledger?"

The Witness: Yes, we——

Q. Took a number of stubs and counted the seconds on them?

The Witness: Yes, sir.

Mr. Shuler: Employees in your New York office?

The Witness: Yes.

Mr. Kinnison: You never checked up on the associated company to ascertain what the actual saving was in dollars and cents?

Mr. Burr: He has already said one company told him.

Mr. Shuler: That is hearsay. What your own hired employee told him is not evidence of it.

[fol. 8257] Mr. Burr: I think the Commission would accept that.

Mr. Kinnison: I think there is no evidence of that at all. It is just staff gossip.

Mr. Burr: If you have that out of your system we will go on to something else.

Mr. Kinnison: It is still very much in.

Mr. Dotson: Just let me ask a question then. How do you gather together these items from the stubs and keep them by monthly totals and classifications so as to know whether it is subscribers' revenue or toll revenue or whatever classification you make of it.

The Witness: With that plan we have developed what we call controlling records and these controlling records are balanced against the service orders which have to do with the installation and the change and the removal of subscribers' services, and we keep an overall control on the amount of revenue. When I say, "we" I have reference to the associated company under the plans recommended. We keep a controlling record from the total amount of revenue which the company is entitled to receive, provided no

reductions are made for loss of service, and we balance the stub records each month against those controlling records. At the same time we post the toll revenue to these toll statements, which are then summarized and the toll statements are attached to the bills and the amounts of the statements are inserted on the bill and on the stub.

Mr. Dotson: Now, these controlling records, they came [fol. 8258] into use simultaneously with the stub method?

The Witness: No, sir, they antedated the stub method. They were developed by the General Staff and are shown in a bulletin which is dated earlier than that one. The controlling records make possible the best installation of the stub plant.

Mr. Harshman: Can you give me the items which compose this twelve cents per station statement?

The Witness: You mean a list of the operations which are required under the stub plan and under the manual method?

Mr. Harshman: Whatever would be necessary in order to include all the items which go in to make up the twelve cents per station. Now, I presume those would be savings on items of performances by clerks and so forth that might be shortened or maybe eliminated. I would like to know what they are, and how you figure the saving on each one of those so as to arrive at twelve cents.

The Witness: I could not today, of course, but I could show you exactly how the work is done under the two plans and where the savings come in.

Mr. Harshman: Where the savings come in?

The Witness: Yes.

Q. Will you try to do that?

A. Yes, sir.

Q. Have you a complete list of the accounting circulars and bulletins which have been prepared and sent out by your department to the associated companies?

A. I have.

Mr. Burr: It may be marked Crunden Exhibit No. 11 and [fol. 8259] is offered in evidence.

And thereupon the list above referred to was marked for the purposes of identification and was offered and admitted in evidence on behalf of the Ohio Bell Telephone

Company, and is herewith submitted, marked Crunden's Exhibit No. 11, and made a part hereof.

Q. Now the contents of Exhibit No. 11 are limited to circulars sent out by your own particular department, are they not?

A. Yes, sir, the comptroller's department.

Q. That is not a set of the circulars but merely a list of them?

A. Exactly.

Q. I have not seen a copy of the Exhibits yet. Can you tell me how many there are in the list?

A. I have not counted the list.

Q. Never mind then.

A. But the Exhibit runs to about five full pages.

Q. In connection with the accounting circulars sent out by your department to the Ohio Bell and other associate companies from time to time, has the recent consideration of the matter of depreciation advanced to the stage where the staff has sent out any circulars on that subject?

A. No, sir, it has not advanced to that stage. The situation is that in the week beginning May 1st last, hearing was held at Washington upon call of the Interstate Commerce Commission, lasted the whole week, and I was the first witness that went upon the stand and I was kept on [fol. 8260] the stand until Saturday and went fully into the matter of telephone depreciation.

Q. On whose behalf did you attend that hearing?

A. On behalf of the associated companies of the Bell system. Appearances were filed on behalf of all of the companies, including the Ohio Bell Telephone Company.

Q. Will you please state to the Commission some of the points which you have covered on behalf of the associated companies including the Ohio Bell Company at that hearing?

A. I made a statement as to what depreciation was and what it involved from the standpoint of the associated companies.

Q. For the benefit of the record will you re-state that?

A. I proceeded somewhat along this line. The subject is so complex, if you wish to make it complex, that frequently people fail to realize how essentially simple it is, but it is possible to put the proposition up in a fairly simple manner, and it is helpful to me to think of it along

these lines, about in this way, that it is the aim of the telephone accountant to keep true books of account when he prepares a balance sheet or an income statement, he must be as sure as he humanly can be that these documents reflect all accounting facts as to the company's condition and the results of its operations. He must show correctly the various items in the balance sheet, the assets and liabilities, and he must carry into the balance sheet the true net income from the operations. Of course, the operating [fol. 8261] net income cannot be correct unless the operating revenues and operating expenses are true and correct.

To have the operating expenses they must include all of the costs attributable to the operations. They must include labor, the traveling expenses, the freight and cartage and so forth, as well as all the supplies and property which are used up and consumed in furnishing the telephone service during the period under consideration. It should be clear, not merely to the accountant but to everyone, that the cost of whatever property is being used up in rendering telephone service is inevitably a part of the operating expenses. We know, of course, that the cost of some things is used up rapidly, as in the case of gasoline and stationery. Then there are other things that are not used up so rapidly, as for example automobile tires, storage, battery plates or switchboard plugs. And then there are items which are used up, relatively speaking, quite slowly, such as poles, wires, cables, heavy machines.

But there is nothing about this feature of difference to change the accounting principles. In any event the expense of furnishing service includes the cost of everything that is used up in furnishing it. Moreover the situation is not affected by how the property is used up, providing it is used up in operations. The expense is evidently an expense of operation, whether the property is worn out by rust or decay or whether it is destroyed sooner or later by storm, or whether it is discarded sooner or later by obsolescence [fol. 8262] or public requirement. It is this expense of property used up which is the depreciation of the accountant.

Depreciation, therefore, may be described as an expense which is occasioned in the operations of a telephone company by reason of the using up of its property in rendering service.

Because books are kept upon the basis of cost, the amount of depreciation is the amount of the original dollars which are being consumed, that is, the amount is fixed by the difference between the original cost of the property at the time it is placed in service and the net residual salvage or junk value which remains at the time the property is taken out of service.

To give the depreciation account its proper setting I should perhaps add a few further statements. As we all know accountants divide expenses into certain broad groups. The principal group in almost any undertaking is that which has to do with the conduct of the business, with the traffic or with the trading end of the business, according to the character of the corporation.

Usually the next important group is that which has to do with the cost of property and that is called the maintenance group. Maintenance divides itself broadly into two main classes. First, there is the expense occasioned by the work of keeping the property in good operating condition during its life in service, and this is known as current maintenance or repairs. And, second, there is the expense [fol. 8263] occasioned by the eventual using up of the units of property in rendering telephone service and the loss of its original cost in spite of current maintenance, and this is the depreciation that I have been considering. Depreciation itself is maintenance, but it is not current maintenance or repairs. Maintenance is a main group and depreciation is a sub-group under it. Current maintenance is another and different sub group. We cannot say that depreciation is repairs nor that repairs is depreciation. The distinction between the two is clear cut and there is no overlapping among them.

It is a fundamental rule of good accounting that charges for expense should be made to the period to which they relate or in which they are incurred, or, as the accountant says, in which they should be accrued, and that rule is rather rigidly adhered to in actual practice. For example, if an insurance premium covers a period of say three years, the cost of the premium is divided between the operations of the three years involved, regardless of when the bill is paid. Similarly, with items of property having a life of several years, the same treatment is given. If the cost of an automobile is lost, for example, due to the using up of

the automobile in the operations of say three successive years, then one third of the cost of the automobile, if there is no salvage, should be charged to each of the three years in question. In precisely the same way with an item of much longer life as for example, underground cable. The loss of its cost or whatever proportion of its original cost [fol. 8264] is lost should be spread over the life in service. That is, the period in which the lost is incurred and in which the expense arises.

I might add that theoretically there are some current expense items, some repairs which should be spread in a like manner to a certain extent. For example, the redecorating of a building, where there does not take place every year but every two or three years.

In practice, however, it is not usual to go into the amount of detail necessary to spread all of these items unless the amount involved is worth while, unless there is some substantial effect on accounting results. On the other side there are some items of property that are so small and inconsequential that it would not do to give them depreciation treatment. For instance, a hammer, an item of property so small that it can be better treated as an item of current repairs, notwithstanding its life in service may span very many accounting periods, providing it be not lost or stolen. The point I wish to make is that there is no different accounting principle involved whether the life of the item is long or short. The test the accountant applies is, does the expense rightfully belong in this or that accounting period. If it does it should go in.

Q. Are these conclusions and principles which you are stating those derived as a result of your study while a member of the General Staff and of your study of the subject as developed by the General Staff prior to the time when [fol. 8265] you joined the Staff?

A. Yes, sir. It should not, of course, be understood by that that the General Staff originated straight line depreciation.

Q. Have the benefits of the studies made by you and by other members of the General Staff been secured to the associated companies including the Ohio Bell Company under the license contract?

A. Yes, sir.

Q. While we are on the subject will you explain the various kinds of depreciation which apply to a telephone property such as that of the Ohio Bell Company?

A. I have stated——

Mr. Kinnison: Will your answer to that question be the course which is followed by the Ohio Bell in setting up its depreciation account?

The Witness: The answer that I am now about to make?

Mr. Kinnison: Yes.

The Witness: Yes, sir. I have already stated that the cost of physical property used up in furnishing telephone service is depreciation regardless of cost, but I can enumerate the principal causes, and they are as follows: The first is what is commonly known as wear and tear, but which I think is better described as rot, rust and decay, that is, the gradual wasting away of certain classes of plant due to exposure and to the action of the elements other than through casualties such as storms. A good example of that is a pole which rots away at the ground line, due to the fact that fungus attacks it as that point, the fungus requiring [fol. 8266] both the moisture in the soil and the proximity of the air.

Then there is obsolescene. Obsolescence may be due to advances in the art, which may be occasioned by equipment changes in a desire to give the best possible service. An example of that would be the old style ring top poles that were used out here in various parts of the country, where a very large pole was placed in the middle of a block and a large number of drop wires run from that pole to the houses of the block so as to give somewhat of an umbrella effect. That is an old style of giving service which has been discontinued in nearly every part of the country because obsolescent.

The third occasion of depreciation is inadequacy. Owing to the continued growth of the country, which makes it desirable to take plant out of service notwithstanding that it has not deteriorated altogether or even in substantial part through rust or decay. We have illustrations of that in the substitutions of large cables for single wires or the substitution of large underground cables for smaller aerial cables.

And then there are many cases where the amount of central office switchboard required causes the building to

become inadequate, requiring the provision of a larger building.

The fourth occasion of depreciation is public requirements. These come in connection with the removal of pole [fol. 8267] lines from streets to alleys or where plant has to be placed underground in the principal business thoroughfares.

A fifth cause is storms and casualties. Property is destroyed frequently — sleet storms, sometimes by windstorms.

Q. Has the effect of these factors been studied by your department with reference to their application to the property of the Ohio Bell Telephone Company?

A. Do you mean the engineering effect?

Q. Yes.

A. Not the engineering effect.

Q. Has the effect of them as items which should be taken into consideration by the Ohio Bell Telephone Company been studied by your department?

A. Yes, and we have concluded that they are all proper parts of the category of expense known as depreciation, and that they can be directly worked into the depreciation treatment so as to give consistent results.

Q. What is the fact as to the importance or non-importance to the Ohio Bell Telephone Company of such elements or factors as obsolescence, inadequacy and public requirements in the matter of depreciation as applied to the property of the Ohio Bell Company?

A. It is a matter of common knowledge, of course, that all of those causes are operating not only in Ohio but elsewhere throughout the country.

Q. As further reflecting on this subject what roughly speaking, has been the growth of the telephone business in the United States since say the beginning of this century?

A. Why to the best of my recollection we had about [fol. 8268] 800,000 at the beginning of the century and we now have about eight million. That is a growth of about a million.

Mr. Shuler: Who is "we"?

The Witness: The associated companies of the Bell system.

Mr. Kinnison: May I interrupt with a question before you pass on, Mr. Burr?

Mr. Burr: Yes, sir.

Mr. Kinnison: You used the word "cost" as the basis upon which you base your depreciation charge. What do you mean by "cost"?

The Witness: I mean the amount shown on the books.

Mr. Kinnison: The actual cost?

The Witness: Oh, yes.

Mr. Kinnison: That means actual cost of construction.

The Witness: Generally speaking it is actual cost of construction, yes, sir.

Q. Has your department studied the matter of what entries are to be made in books of account of the Ohio Bell Telephone Company and the other associated companies with reference to depreciation expense?

A. Yes, we have given very careful thought to the proper manner of setting up the depreciation.

Q. Has the Ohio Bell Company had the benefit of that study?

A. Oh, yes.

Q. Will you illustrate it for a moment?

A. Our view of the matter has led us to this conclusion, [fol. 8269] and I think it is an absolutely sound one. In a double entry system of bookkeeping, such as is almost universally employed, when you place in the accounts and monthly or annual charge for depreciation expense—and in our telephone companies the depreciation is taken into the accounts monthly—it is necessary to have some sort of suspense account, where the contra-entry or credit can be lodged. In a single entry system of bookkeeping a charge to expense would in and of itself be sufficient to insure the integrity of the accounting. So that the prime side of the entry, the important feature of the accounting, is the charge to expense, which is necessary to show the total expense of rendering service, and thereby arrive at the true net income.

Now, the credit which arises by reason of the double entry system of bookeeping and on account of the charge to expense is placed a temporary lodging place which has been called the reserve for depreciation. In the uniform system of accounts it is entitled reserve for accrued depreciation account. This credit will go on accumulating from month to

month as the successive months' installments of depreciation expense are accrued. At the end of a certain length of time the item of property or the class of property to which the debits and credits have related will be retired from service and at that time the amount at which such items stand charged to the plant account should be credited to that account, the salvage should be charged to the sup-
[fol. 8270] plies account or to the person who receives the salvage, and the balance, representing the loss, should be placed in the reserve account and offset against the reserve, and it is finally wiped out, and, therefore, all recognition of the depreciable unit or item of property disappears from the book. You might say this as a general rule, extinction of depreciable capital on the books is always accompanied by extinction of the reserve account raised upon the books in respect to the same property loss.

Mr. Dotson: In what way? Can you explain it?

Q. Take the example of a thousand dollar automobile.

A. In the case of the thousand dollar automobile the original entry would be to credit accounts payable and charge plant with the automobile. Now, we decide that the automobile is going to last in service for four years. Each year we should charge depreciation expense with $250.00 and credit depreciation reserve account. During that four years in succession we have so treated $1,000, which is the entire loss on account of the retirement of the automobile,——

Mr. Shuler: Don't you allow anything for interest?

The Witness: No, sir, it is not necessary to take interest into account in this treatment, and the introduction of interest calculations into the treatment would produce erroneous results. At the end of the four years you have $1,000 in the plant account for an automobile immediately to be retired and $1,000 in the reserve account. The debit to the automobile account is carried on the asset side of the bal-
[fol. 8271] ance sheet. The reserve for depreciation account is carried on the liability side of the balance sheet. When the automobile is retired, you offset those two items, that is, you credit the plant account and debit the reserve account. That results in cancelling the whole transaction out of the balance sheet just as though it never existed.

Mr. Dotson: Suppose it would be the case of property

that is not retired at the end of the depreciation period. How do you dispose of it then?

The Witness: You mean, for example, if we had an automobile and it was worn out and instead of the report being made that that capital had been consumed, that we allowed the automobile to remain somewhere and did not make proper accounting entries.

Mr. Dotson: No, I did not mean that. I mean a property that has a more or less indefinite lifetime period, although your depreciation account is carried on a ratable period, say of ten years, and it outlives ten years; you find at the end of ten years that the property is still capable of being operated in service; you have already charged off now the cost of it. What do you do with the property when you find it is still serviceable?

The Witness: May I defer answering that question until after I have placed in evidence an Exhibit that I have here which will lay the foundation for a correct answer and perhaps clear the thing up better.

Mr. Dotson: I have no objection at all.

[fol. 8272] Q. While we are on that subject, let me ask you whether the reserve account serves any other useful purpose than to act or serve as a suspense account or temporary lodging place for the credits which arise in the double entry system as the result described by you of making the debits to the operating expenses for the monthly installments of the depreciation charge.

A. That question I think I can answer better after I have placed these Exhibits before the gentlemen here. The first one I would like to introduce is entitled "Illustration of Method of Determining Annual Depreciation Expense."

Mr. Burr: It may be marked Crunden Exhibit No. 12, and we offer it in evidence.

And thereupon the paper writing above referred to was marked for the purposes of identification and was offered and admitted in evidence on behalf of the Ohio Bell Telephone Company and is herewith submitted, marked Crunden Exhibit No. 12, and made a part hereof.

Q. Now, you may proceed with the discussion of the Exhibits and also the answer to Mr. Dotson's question if you are prepared to go into that now?

A. No, I have another Exhibit coming which will tie the thing up very nicely.

Q. Shall we offer that Exhibit now?

A. I think not, I think we better take one at a time so we won't get mixed here.

[fol. 8273] Q. Very well.

A. In this I show some typical classes of telephone property in the first column, and in the second I have placed the items of cost. I might say that this whole Exhibit is merely illustrative or perhaps you might call it hypothetical. In the third column I show the average service life of the respective classes of property in years. In the fourth column there is the gross salvage, that is the gross amount that you obtain from the property, if anything, at the time this useful life of service is terminated. In the first column I show the cost of removal, which is a charge upon the gross salvage. And in the sixth column I show the really significant salvage figure, which is the net salvage or the gross salvage minus the cost of removal. In the seventh column I show the per cent that the net salvage is of the original cost of the same property. In the eighth column I show the amount of the property cost which is used up, that being the cost column, two, minus the gross salvage—minus the net salvage, column 6. In column 9 I show the per cent that the property cost used up is of the total cost. In ten I show the depreciation rate expressed as a percentage of the cost of the property, arrived at by dividing——

Mr. Dotson: That is the annual depreciation rate.

The Witness: Dividing column 9 by column 3. In the last column, column 11, I show the annual depreciation expense expressed in dollars as derived by the application of the percentage in column 10 to the cost as shown in [fol. 8274] column 2. The rates shown in column 10 are sometimes called the element rates of depreciation or the component rates. And they are the true depreciation rates. Frequently reference is made to a composite rate of depreciation. When the engineer speaks of depreciation he is referring usually to the component rates. If you say to the engineer, "What is your depreciation rate?" he will say, "Do you mean the rate on cables or the rate on poles, or what rate do you refer to?" But the accountant, who usually has to talk to financial men and to business men, who want some quick answer regarding the plant as a

whole, are accustomed to speak of the composite rate. That is arrived at by taking the total cost of all of the various classes of property involved, and dividing it into the annual depreciation expense, arrived at by properly weighting the individual classes of expense in accordance with individual amounts into the total and procuring a composite depreciation rate. The composite depreciation rate is therefore accidental. It depends upon the amounts of the depreciation, of the element or component rates of depreciation, and the accidental weighting in accordance as there is more or less of longer lived or shorter lived property or property having a high or low salvage value respectively.

Mr. Dotson: It really represents the average life.

The Witness: Yes, sir, it is a weighted average. As an appendant to that I would like to offer a couple more of Exhibits.

[fol. 8275] Mr. Burr: They may be marked Crunden's Exhibits Nos. 13 and 14 respectively and we offer them in evidence.

And thereupon the paper writings above referred to were marked for the purposes of identification and were offered and admitted in evidence on behalf of the Ohio Bell Telephone Company, and are herewith submitted, marked respectively Crunden's Exhibit Nos. 13 and 14, and made a part hereof.

Mr. Dotson: Before you get away from this, just one question we want to ask with reference to it, to this one subject you are speaking about. The percentage of annual depreciation, the rate of annual depreciation as shown in column 10, are those the rates which the associated companies employ in carrying their depreciation?

The Witness: No, sir, those depreciation rates are hypothetical and do not apply to any particular company or condition whatsoever.

Mr. Burr: There will be a witness on that subject at a later point, Mr. Dotson.

Mr. Dotson: All right.

Mr. Kinnison: The actual worth of your depreciation charges here is reflected upon the truth of the data supplied to you as to actual depreciation, is it not?

The Witness: Yes, sir.

Mr. Kinnison: Coming down finally to an engineering

proposition as to how much a certain class of property de-
[fol. 8276] preciates.

The Witness: That is correct.

Commissioner Poor: Do you intend this Exhibit to be any more than illustrative of the method?

The Witness: Illustrative of the method only.

Commissioner Poor: And the figures in your third column do not represent, or are they intended to represent, experience of the company in any way?

The Witness: No, sir.

Mr. Shuler: They are not supposed to illustrate the experience of the company?

The Witness: They are illustrative. I did not want to put preposterous lives in here which would apprise you of that, because the thing might then look ridiculous.

Mr. Shuler: This is just an example of your method.

The Witness: Yes, sir.

Mr. Shuler: And has nothing to do with the telephone business particularly.

Mr. Burr: It has something to do with the telephone business. But we will offer a witness later on.

Mr. Shuler: I get the point. He has taken that because he is in that line, but he does not mean to say that these are the lives of those particular items.

Q. Now, going back to my previous question, I will ask you whether the reserve account of the Ohio Bell Company has any other useful purpose than to serve as a suspense account or temporary lodging place for the credits which [fol. 8277] arise in the double entry system as a result of the making of debits to the operating expenses for the monthly installments of the depreciation charge?

A. I think Exhibit 13 will enable me to answer that question. But it just occurred to me, if I may delay the proceedings a trifle longer, that I ought to file Exhibit 14 with Exhibit 13, because it refers to the same subject matter and will illustrate the facts in 13.

Q. It has already been offered in evidence.

A. Then I am off. It must be 14 and 15, because I have some charts which are appendant to this Exhibit marked table A and table B. These sets of graphical charts which make clear better than you can see by handling the figures on table 13 the exact relations of those figures, one to the other. It is called chart, A, B, C and D.

Table A of Exhibit 13 shows the correct manner of arriv-

ing at the average life of a homogeneous group of telephone property, such as for example poles, although the property is described here abstractly as units. There are a thousand units, and these units go out of service at a certain rate. Five units go out the first year, seven the second year, eight the third year and so on. And as you approach the average expectancy of life of that kind of property at about the 9th, 10th, 11th and 12th years, the major portion of the group go out of service. A certain number of stronger or more fortunate survivors continue in service for various periods thereafter until at the twentieth year the last five have gone out of service and the life of the [fol. 8278] entire thing is terminated. Now, to arrive at the true life for depreciation purposes, you have to secure a weighted average by multiplying the number of units by the number of service years, so as to obtain what you may call the unit years, and the summation of the total unit years divided by the number of units gives you the average service life. That is shown in the calculation at the foot of the table.

Table B is an illustration of the accounting on the books with respect to a similar group of property. At the beginning of the first year the investment is a thousand dollars. During the first year $5.00 comes out of service due to the retirement of five units. The average investment for the year is decreased to $997.50. The depreciation rate is ten per cent, because the average life of the property is ten years and there is no salvage. We apply ten per cent to the average investment of $997.50 to obtain the proper charge to expense for the first year, amounting to $99.75. That is placed in column D under the heading of analysis of entries passing through depreciation reserve account. In the same year the five units which are retired from service are charged against the depreciation reserve account at the same time that they are credited to the plant account, so that the net annual change in the reserve account is $94.75. And since this is the first year that constitutes the balance remaining in the account at the end of the year.

Now, the procedure in the subsequent years is precisely the same, and the noteworthy thing is that the credits the [fol. 8279] annual credits, continue to be in excess of the debits until the seventh year inclusive, as shown by column F, after which the debits become in excess of the annual credits, and so tend to reduce the existing balance in the

reserve from time to time until at the end of the time shown by the table, that is, the twentieth year, the whole of the reserve account has been wiped out coincidentally with the going out of service of the last survivors of the group.

The charts which accompany table A and table B show that investment begins with a thousand dollars and that there is a decline in the investment every year until the whole investment is wiped out. Chart B shows the balance in the reserve for depreciation account.

Q. Are you now referring to Exhibit 14?

A. Yes, sir. It goes on increasing up to a certain point where the principal part of the retirement comes into full play and thereafter decreases to zero. Chart C shows the annual charge to expense follows a similar curve to the investment. When the investment is high the charge is high. When the investment is decreasing the charge decreases correspondingly, and when the investment is gone, no further charges are made because no further charges are necessary.

Chart D shows the annual retirement of the units and corresponds to the first column of table A. This chart is headed annual mortality, for the reason that it indicates what may fairly be described as a mortality curve.

Now, answering Mr. Burr's question first—I guess you [fol. 8280] gentlemen have in mind what it is or should we read the question? We have had it twice.

Mr. Shuler: I think we have it.

The Witness: It is the proposition of whether the reserve account serves any other useful purpose than to serve as a lodging place for these credits. Any my answer would be yes, that it does, for this reason, that just as by looking into an actuarial table of a life insurance company you can find from time to time the average remaining life expectancy of a group of individuals, so by looking into the depreciation reserve account balance from time to time you can, if properly kept show the accumulated liability to date for future retirement of plant presently in service which is deteriorating but which has not yet reached the end of its useful life.

There is one point I would like to bring in there, and that is this, I have shown these Exhibits relating to what I call the homogen-ous group of units. There are cases where it might be desirable to account separately for the units.

But generally speaking it is necessary to account for the units in groups, and when that is true, attention ought to be called on that to this point, that the depreciation reserve calculations are based upon the average service life of the group of units, and when you are talking about groups, where the units are averaged in together for depreciation treatment, it is improper to speak of the amount which has been credited to reserve of a particular unit, since the re- [fol. 8281] serve has necessarily been accrued in respect to the whole homogen-ous class of property, consisting of a multiplicity of units exhibiting various individual lives. The actuarial basis as applied in life insurance involves in the computation of premiums the recognition not only of a life expectancy for a large group of individuals, but also of a mortality curve representing the manner in which their respective ages at death will be distributed at the average age at death, and it is precisely the same with depreciation. That is why I have inserted that column D showing annual mortality.

Q. Chart D?

A. Yes, Chart D. Does that answer your question?

Mr. Harshman: Exhibits 13 and 14 are purely hypothetical, are they not?

The Witness: The figures shown in here?

Mr. Harshman: Yes.

The Witness: Yes, but they are illustrative of true principles.

Mr. Harshman: But the figures are purely hypothetical.

The Witness: Yes.

Mr. Shuler: Mr. Crunden, Exhibit 12—do you think that method of depreciation is fair to the utility and also to the rate payers?

The Witness: Yes, sir, eminently fair.

Mr. Shuler: Now, the idea of it is that at the end of the life you will have a sum equivalent to what has been used [fol. 8282] up. That is correct, is it not?

The Witness: Yes, sir.

Mr. Shuler: Now, take the item of buildings, the first item, 25 years. You set out a sum each year so that at the end of the 25 years the capital will be intact—$2,132.00; that is right?

The Witness: Yes, sir.

Mr. Shuler: Repairs on the building are taken care of otherwise, are they not?

The Witness: Yes, sir.

Mr. Shuler: At the end of 25 years your $2,132.00, with simple interest at five per cent, instead of amounting to $28,700.00 amounts to a little over $49,000.00; how is that fair to the rate payer?

The Witness: Would you mind reserving that question until we get through with the whole story and then I will bear that in mind and be very glad to answer it. I will answer it now if you prefer, if you are going to leave or anything like that.

Mr. Burr: Yes, I have reserved one or two questions for Mr. Kinnison at his suggestion, and if it is satisfactory to Mr. Shuler, I will put him on the list, too, as wishing to ask this question at the close of this statement. Will that be all right?

Mr. Shuler: That is all right. I don't care when I get it.

The Witness: Ordinarily it is very easy to answer those [fol. 8283] questions but this question is a little more difficult than the average subject.

Mr. Shuler: It is immaterial.

The Witness: And we want to keep a firm footing under ourselves and not get tangled up.

Q. There are at this point one or two questions that I want to get clearly in mind, and the first is as to whether there is a reserve in the sense of a separate fund on account of depreciation under the straight line method of depreciation account which you have been discussing?

A. No, there is not. The reserve as used by accountants is virtually a slang term. You won't find it in the dictionary. Our use of the word "reserve" does not conform to the dictionary distinction. The reserve and the fund are used in the proper manner for example by banks in connection with the reserves which they must carry against their liabilities. For instance, the Federal Reserve Banks must carry a certain reserve in gold, silver and legal tender as against the notes that they put out, and it would be possible for them to tack that reserve in a satchel and carry it from one place to another. That is a true reserve or fund. But this reserve of which we are speaking is nothing more than a series of accounting entries. They exist only on the books.

Q. More properly it is termed reserve account, isn't it?
A. Reserve account.

Mr. Dotson: But it is actually recovered by the incomes of the company, is it not?
[fol. 8284] The Witness: The charges to expense should operate to retain in the undertaking amounts equivalent to the charges; that is, they prevent corresponding amounts from increasing the income of the company in such a way that they could be disbursed in dividends for example.
Mr. Dotson: They should not be disbursed in dividends, should they?
The Witness: No, sir.
Mr. Kinnison: They can be reinvested by you, though?
The Witness: They are no different than any other funds which the company owns and they are commingled with them and used for any proper corporate purpose.
Mr. Kinnison: It is actual then to the extent that you do use it for extensions.
The Witness: We use our assets for extensions; any funds of which we may be possessed and for which we have no other use we can use our extensions or any other purpose that is proper.
Mr. Kinnison: As a matter of fact you are entitled to show that the money which you used in the extension came from the depreciation reserve account?
The Witness: You can show that they came from depreciation reserve account?
Mr. Kinnison: Do you?
The Witness: No. I think I can clear that up in connection with the other question that Mr. Shuler asked.

Q. The other point which I have in mind is this; is the [fol. 8285] account for depreciation in any respect an account for replacement?
A. No, sir, depreciation expense is the same whether or not there are made replacements; that is to say, if you have an automobile and it is used up in rendering service, that depreciation happens whether or not you buy another automobile. And a great deal of confusion attending the question of depreciation has arisen from the attempt to consider depreciation in connection with replacements. There is *no* absolutely no connection with replacements. It is a question of retaining out of the revenues of the company

or undertaking amounts equivalent to the original cost of property used up in operations.

Q. Without meaning to go over the same ground with each one of your answers, let me ask you whether or not these principles which you have been enunciating here have been arrived at as a part of the study and work of the General Staff?

A. Yes, sir, we have been studying this question ever since I have been in New York. I have been putting in a great deal of my time personally on this question.

Q. Will you explain the fundamentals of a proper method of determining the annual depreciation expense for the Ohio Bell Telephone Company?

Mr. Kinnison: Read that, will you please?

(Question read.)

A. In the first place you must know the amount of the property that is to — depreciated. In the next place you must estimate the average service life in years. In the third [fol. 8286] place you must estimate the net salvage which will be realized upon the retirement of the property. Having those factors, it is a simple mathematical calculation for the accountant to determine the depreciation rate.

Q. Have you a chart on that subject or is that covered by one of your previous charts?

A. That is shown on Exhibit No. 12.

Q. And you have no original chart on that subject?

A. No, sir.

Q. I think you have already made it clear that the figures in that chart are hypothetical only.

Mr. Shuler: Right.

The Witness: Yes, illustrative.

Q. I think you have also explained that the real rates of depreciation are the component rates for the various classes of plant and not the composite rate for all, which is the product of the component rates?

A. I have.

Q. You have already covered that?

A. Yes, sir.

Mr. Dotson: How do you estimate this service life? Is that based upon actual experience or otherwise?

The Witness: The uniform system of accounts requires that the depreciation rate shall be based upon the com-

pany's history and experience, and it places upon the proper officials of the company the duty of giving correct estimates of such life, which they must be prepared to support by sworn statements if the Interstate Commerce Commission so desires. It is necessary for the engineer or whoever is [fol. 8287] given this responsibility to study carefully the life of telephone property, obtaining all the information that he can regarding the past life and past salvage. And he must also carefully consider the changes in the kind of plant and changes in the art and the prospective future developments which will affect the life of property, so as to obtain a fair and reasonable estimate of the present and future depreciation rate. That is the responsibility placed upon him by the Federal Law and that is the manner in which it is done. I think this is an appropriate place for me to answer your question, Mr. Dotson. You said, I believe, "What would you do with reference to a structure of relatively long life, of which in the beginning it was possible to make only a rough estimate?"

Mr. Dotson: An estimated period. That is, you had an estimated period?

The Witness: Yes, sir. In a case of that kind it would be necessary to make the best estimate that you could make. It would have to be made by somebody who was familiar with that property, usually the engineer, and that rate would be used until as the life of the item progressed you got a little better picture of what its ultimate life was going to be, and then you would modify your depreciation rate so far as necessary to continue to spread as evenly as possible throughout the life of the property the cost of the capital which was being consumed in operations. The nearer you came down to the end of the life the better view you would [fol. 8288] have of the remaining portion, and it would be the duty of the engineer to adjust that from time to time. Upon the face of the proposition it is not a matter about which you can have certainty. It looks into the future and everyone must frankly admit that there is an element of estimate in it, and that element of estimate becomes more prominent in proportion as the life of the property is very long and the future salvage level is unknown.

Q. Now, right there, that estimate you are talking about is based upon property as a class and not individual items of that *l*class of property; isn't that true?

A. Yes, sir, almost invariably one item is offset against another, so that if you over estimate on one there is quite a possibility of your under estimating on another, just as it is possible for an actuary to tell when any individual is going to die; he may form a very close approximation as to the average length of life of a large group of individuals of that class. So with telephone property. When you have a large number of units your estimate is going to be more nearly accurate, and there is always that duty upon the responsible official of keeping close watch of this situation, and using from year to year the proper depreciation rate which he can substantiate before the Federal authorities. This expense is a definite certain expense of operation, and therefore, it must be accounted for, and in the absence of actual information under the exact amount of the expense, it must be accounted for as well as the circumstances per- [fol. 8289] mit. It is like a great many other questions that come up in the operation of any big business, whether it be public utility or any other; that is to say the problem of determining correct depreciation rates is no greater than many hundreds, I might say, of business problems which are daily coped with by responsible business men. It is no greater than the problem which the Ohio Bell Company is today involved in determining the most efficient operating methods for use in the present and in the future and in selecting proper types of plant for use in the future and other questions of great moment of that character.

Q. When you say that the average life of a certain kind of plant is ten years, that does not mean, does it, that all of the items live ten years?

A. No, sir, that is the object of bringing in tables A and B, Exhibit 13 and the accompanying charts of 14.

Q. Nor does it mean you go on making the entries for depreciation expense in the same monthly amounts for ten years?

A. No, we do not. There seems to be an idea I run across it from time to time—that we have certain property which is going to have an average life of ten year- so we set up some kind of a prepaid record, we divide the consumable outlay by ten, and then above one tenth into each of ten succeeding years. That is not the idea at all. The idea as expressed in these charts is that when the method used by these charts and tables is applied, it results in charging it [fol. 8290] with only the proper cost of the using up of the

property, which is giving service in that year. For instance, referring for a moment to table B of Exhibit 13, so long as a thousand units are in service you — charging depreciation upon a thousand. In the last year when five of those units remain in service you are charging depreciation only upon five.

Q. And if your plant grows you have a charge on a greater number?

A. Yes, sir.

Q. Now, one of these charts before us shows certain property which gradually disappears. It isolates, we might say a specimen or kind—specimen of property is better—for examination; but the telephone plant does not disappear; it continues. What is the relation of this chart to the continuing plant?

A. Let us refer to Exhibit 14.

Q. Yes.

A. Chart A. That is not the investment in an entire telephone company that is referred to there. That is the investment in a certain group of telephone property, representing the amount placed in service in the year one. Now, other property has been placed in service in the year two and other property in the year three and in the year four and so on. So that if you were to deal with the total telephone plant of that class, you would not have one curve sloping down like the one on Chart A, but you would have a continuous series of curves, one right after the other, and it is possible by taking a cross section through a continuous series of curves of that kind to obtain a pretty good indication of the average service life of a homogen-ous [fol. 8291] group of property by what is known as the turnover cycle method, because you can see how much property comes out of service between the two dates.

Let me explain that a little further. You would get at any date you made such examination the principal part of the retirements in respect of certain groups. That would be the middle part of the retirements, the part that clusters around the period of greatest mortality. You would also get a certain amount of retirements on plant recently installed, representing the shortest life elements of that group. You would also get a certain number of retirements representing the longest life survivors of some long antecedent group, and by getting that thing properly proportioned, you can get a fair idea of average life. It is not

quite as easy as reading the newspaper, of course, and when you get it you have to use it with judgment, because that at best will only represent what the life has been in the past and that is not your final answer. What you must obtain is the life of the present property, and therefore, you must apply judgment to those results.

Q. In connection with these studies which you have made have you determined whether or not it is proper to take the actual amount of retirements, say over a period of ten years, and ascertain the relation of the amount to the average property in service over this same period, and then use this per cent relation as a basis for annual depreciation charges for retirements for the future.

[fol. 8292] Mr. Kinnison: He is not qualified on that. You are referring to actual displacements?

Mr. Burr: No, not as to amounts.

The Witness: I have a series of Exhibits. When I say series, I think I have a half a dozen. They are all interrelated, and it does not require much explanation to cover that phase of the matter, and several other phases or I can introduce a single Exhibit on that particular subject.

Q. Will you introduce one on that particular subject first and discuss it, following it with the other Exhibits later?

Mr. Kinnison: Is the basis of your Exhibit hypothetical or is it based upon facts?

The Witness: It is based upon the facts, Mr. Kinnison.

Mr. Kinnison: Dollars and cents?

The Witness: It is based upon accounting principles.

Mr. Kinnison: Dollars and cents, retirements of property in actual operation?

The Witness: It has no extended calculations. It represents an idea. It shows what you can and what you cannot do under the uniform system of accounts.

Mr. Burr: It may be marked Crunden's Exhibit No. 15, and is offered in evidence.

And thereupon the paper writing above referred to was marked for the purposes of identification and was offered [fol. 8293] and admitted in evidence on behalf of the Ohio Bell Telephone Company, and is herewith submitted, marked Cruden's Exhibit No. 15, and made a part hereof.

Q. Prior to the short recess, Mr. Crunden, you had identified Crunden Exhibit 15, and it had been offered in evidence. Will you explain the chart which represents that Exhibit?

A. This chart makes a contrast between the standard method of accounting, that is, the straight line depreciation, and a plan which has been usually called the retirement theory or retirement method. That is a name which has clung to it, although it is not to be dignified by calling it a method. It is a source of confusion, because the depreciation reserve account is really a liability for retirements account. But there are certain errors in this so-called retirement theory which are very bad indeed, and it is desirable to clear up any confution there may be between the legitimate handling of a depreciation reserve account for the purpose of taking care of your retirements and the erroneous assumptions involved in the improper retirement theory.

The first half of this Exhibit is a simple exposition of the treatment of certain items under the straight line plan. It assumes a growing plant, composed of units costing a thousand dollars per unit, and salvage is assumed to be zero, to simplify the illustration. In the first period of five years, [fol. 8294] it is assumed that one thousand dollar unit has been placed in service. It is used for five years, and upon its wearing out and being retired, there is a loss of a thousand dollars. Manifestly the depreciation expense for this period is a thousand dollars for five years, equal to $200.00 per year, or twenty per cent per annum.

It is then assumed that there is a second period of five years, in which due to the growth of the property, there are two one thousand dollar properties. These are retired in five years and retired with a loss of two thousand dollars. The depreciation expense for this period is similarly calculated in five years, annually $400.00, making the rate twenty per cent per annum, the same as before. We then go on to a third period, in which three units are in service. Here it is estimated that the life is five years and that the loss will be $3,000. So that the proper way of charging up depreciation would be to estimate that the rate of twenty per cent per annum is the proper rate to continue because the loss is now expected to be $600.00 per year on a first cost of $3,000.

Now, in the latter half of the Exhibit it brings out this point, that it is incorrect and contrary to the provisions of the Interstate Commerce Commission system of accounts to divide the amount of the past retirement loss by the amount of any property other than the particular property the retirement of which made the loss. The result of such calculation is meaningless and signifies nothing as to [fol. 8295] the average life of the property or the annual depreciation of the present property. That is then shown by an example. Here in order to bring out the false relationship which is engendered by the so-called retirement theory, the periods are assumed to overlap. This one $1,000 unit is placed in service and before it is worn out and retired two additional $1,000 units are placed in service. The relationship of the retirement loss of $1,000 to the original $1,000 unit is the correct relationship, as in the illustration above. The relationship of the loss of $1,000 in connection with the first unit to the original cost of the two $1,000 units which are in service at the time that the first unit is retired is a false relationship. It is incorrect to relate the loss of $1,000 on the first unit to the cost of $2,000 on the second and third units, or in fact to relate it to any cost other than the cost of the first unit.

Now, that idea is carried across the statement with respect to the second and third units, and in the fourth unit in the fourth period it shows that there may be any part of units placed in service or there may be none at all remaining, but nevertheless, the fourth, fifth and sixth units may be worn out and retired during that period. There are various ways of making calculations under this so-called retirement theory. The basis of them is to take the realized depreciation or the expense on account of completed retirements, that is, the charges against the reserve in the current year or in some other year, and divide them [fol. 8296] by the amount of plant presently in service or by an average of the amount in service over a preceding series of years. Any percentage obtained in that manner, no matter how, is bound to be wrong unless it accidentally coincides with straight line depreciation. That is, if in the process of making such a calculation you should accidently hit upon a combination which represented the retirement loss of certain property and you accidentally used the original cost of that property as your devisor in making

your calculation, you would then be on the straight line basis, that is, you would be on the exact basis shown in example A, and which is illustrated in preceding Exhibits, but the chances of doing that are so exceedingly slim that the worth of this so-called retirement theory in estimating the depreciation rate is pretty nearly zero.

Q. In other words, it is not correct to find the relation of the plant retired to the retirements in the year, to the total plant in the year during which the retirements take place.

A. There is no connection between the two things because the retirements represent the loss on property which has already gone out of service. The present plant account represents property which has not gone out of service and which may be an entirely different plant. In other words, if you had a Ford automobile and in this present year of grace 1924 it was retired from service at a loss to you of $300.00, whether or not you might have a Dodge or a Cadillac to replace that, would have nothing to do with it, and if [fol. 8297] you divided the cost of the Dodge or the Cadillac into the retirement of the Ford car it would get you no where.

Q. Have you, Mr. Crunden, some charts in which you have applied this straight line principle to an assumed taxicab business in a similar way?

A. Yes, sir, I have an- I think that they are very good charts to shed light on this whole question.

Mr. Dotson: Speaking of the illustration you gave of the Ford automobile and the probable Dodge or Cadillac succeeding it, the only thing that you would carry into the depreciation account on that Ford account would be the original cost, would it not?

The Witness: In the illustration that I gave, the error consists in arriving at the depreciation percentage by using as the devisor something other than the cost of the Ford car. If you should use the cost of the Ford car in arriving at that result, your answer would be correct as to what depreciation you have had in the past, and then with that in hand you go forward and estimate what it would be in the future.

Mr. Dotson: But then the rate of depreciation that you do apply seeks to only retire the original cost in the end in any event?

The Witness: Yes.

Mr. Dotson: And that is all that would be retired?

The witness: Yes, that is all. There is a chance there for people becoming confused, because there is a legitimate [fol. 8298] retirement method, which is the straight line depreciation method, and then there is this erroneous and improper method which is confused with it, because it is a rather difficult subject to see clearly, unless you are working on it or unless you are an accountant.

Mr. Dotson: That is due to the fact that you take into consideration just the specific property which may be related up to other properties employed in the same business in which the depreciation fund accrues, or on which the depreciation fund accrues, for you are dealing with it as a property as a whole and not in each property in a specific way?

The Witness: You are dealing with each class of property. That is right, and if the class of property remains the same——

Q. Whatever your unit is, whether it is a class or whether it is an entire equipment, it does not matter; whichever unit you adopt the rate that relates to each particular specific item is the rate that applies to the unit.

The Witness: That is correct, yes.

Q. But you cannot get the proper rate by applying the value of the Ford car or the cost of the Ford car to the value of the Cadillac which is in service, can you?

A. No. The calculation to be made properly must take the salvage on the given property, subtract it from the original cost of the same property and divide it by the number of years that that property was in service to ob- [fol. 8299] tain the depreciation rate.

Mr. Dotson: Now, in this connection should the accrued book depreciation then equal the observed or appraised depreciation.

The Witness: No, not necessarily.

Mr. Dotson: Why not?

The Witness: It might by accident, but the chances are it would not. Well, the depreciation of the engineer which he uses in arriving at the condition of property has reference to the specific condition of the property as it exists from time to time. The depreciation of the accountant,

and perhaps it ought not to be called depreciation at all, but ought to be called the charging off of retirement expense, had to do with a bookkeeping procedure for a spreading of the expense of property used up in operations in a most equitable way to successive accounting periods. Now, there are two distinct things there and it is obvious that they could not be identical, because their aims are different. When the engineer is dealing with property the question before him is, what is the condition of this property?'' And he had to be familiar with the property and ascertain its condition in point of fact. But the engineer adopts a rigid mathematical accounting procedure for charging up depreciation expense, and he does it in a manner which is good accounting procedure and equitable from the Public Utilities standpoint, because nothing could be more equitable.

Q. You said the engineer did that. You mean the ac- [fol. 8300] countant?

A. I mean the accountant. You will have to pardon me and watch me I guess. Nothing could be more equitable if a pole line is in use for ten years and then retired from service and its cost lost than to apportion its cost in equal installments over the service life. There is no good reason why more should be charged in the beginning and less at the end and no good reason why less should be charged in the beginning and more at the end. All of the traffic over that line should bear its pro rata portion of the capital used up in maintaining the line.

Mr. Dotson: Is the engineer's depreciation based upon physical depreciation or functional depreciation?

The Witness: It is based on both so far as they exist. If the engineer goes out and examines the property and finds there is manifest physical deterioration, it lessens the value of that property and he should take it into account. Similarly if there is manifest functional depreciation that has a bearing on the value and it should be taken into account. Of course, the engineer cannot find in depreciation which shows no obsolescence or inadequacy any such factor. The accountant in dealing with classes of property as a whole, if he knows that there is a certain amount of obsolescence and inadequacy which has been met with in the past and is going to be met with in the future, as a regular part of the operations of the business, he will naturally require the engineer to estimate on that as one of the factors

that tends to shorten the life of the property, and that will [fol. 8301] all be rolled into the general average which is used in determining the average service life.

Mr. Dotson: Then the engineer's estimated life of the property is not the basis of your depreciation retirement; it is that of the accountant rather than the engineer; isn't that true?

Mr. Burr: Mr. Dotson, will you ask the question in this way so as to make it a little clearer? Does the engineer's estimate at any particular time as to the condition of the property bring about what you are trying to get?

Mr. Dotson: Put that down and I will see what I get.

The Witness: I don't get the question now between the two of you.

(Both questions read.)

The Witness: I am not entirely clear as to what the question is, but I will answer it. It can be hardly expected that a purely mathematical basis of charging depreciation expense in the accounts would coincide with the change in the observable value of property as it might exist from time to time in actual fact. As I have previously stated I do not think there is any connection between the two things. The two depreciations do harmonize at two points. One is when the property is new and you are just about to get ready to make the first entry. You have nothing on your books and you have a 100 per cent condition in your property. It harmonizes again at the moment of retirement, because then the accountant has accrued on the books [fol. 8302] the amount of the loss and the engineer finds the property in zero condition plus any salvage. But in the change in between there is no connection between the two things that I can see.

Mr. Dotson: Is there an actual study and survey made by the engineer—that is, this part of the work—or by the accountant as to the functional life of a class of property that is in use in order to determine whether the life of that property will correspond to the estimated period or will exceed it or be less than that.

The Witness: Such a study is necessary on the part of the engineer in arriving at the life for use in determining depreciation rates, yes, sir.

Mr. Dotson: My question is do they actually do it?

The Witness: Do they actually?
Mr. Dotson: Yes.
The Witness: Oh, yes.

Q. And that is entirely different from the per cent which the engineer makes in order to determine the per cent condition of the property at any particular time?

A. Yes, it is quite likely to be. Going back to life insurance for an illustration——

Mr. Dotson: Well, then, with all the experience that the company has had in dealing with the life of different classes of property and equipment, it has not yet learned to know just what the real average life of any class of property may be; it still requires this different study and survey to be made from time to time of different classes of property to [fol. 8303] determine what the actual life will be for the purpose of carrying out your depreciation reserve in accordance with the actual life.

The Witness: Yes, and that will always be the case, Mr. Dotson, because we cannot look forward to a time when the plant will get into such a state that it remains the same and the accidents and causes that terminate its life remains the same forever. A telephone plant is changing all the time and you have to take that into account when you arrive at a depreciation rate to be given to the accountant to charge up the proper amount of depreciation expense in any year.

Mr. Dotson: Well, you do have an average life period for each class of property?

The Witness: Yes, sir.

Mr. Dotson: It has been worked out from your experience.

The Witness: Yes, sir, by the engineers.

Mr. Dotson: Are we to understand, however, that that is not yet accurate enough in order that you can rely upon it in dealing with your depreciation retirements?

The Witness: Oh, yes, it is accurate enough to rely upon it for that, and we do rely upon it and we make it the basis of our sworn annual reports to the Interstate Commerce Commission. I do not know what I have said that would give you the impression that we do not rely upon it or we do not have such records unless it is that I mentioned that [fol. 8304] there would always be an element of estimate in it.

Mr. Dotson: That is exactly what I had in mind.

The Witness: Yes, it is obvious that as to that extending into the future there is always an element of estimate.

Mr. Kinnison: You used the words, "True depreciation" in one of your answers recently. Is it the theory of the true depreciation that you seek to amortize the loss of your original investment?

The Witness: Yes.

Mr. Shuler: It is a trust fund, isn't it, for the rate payers; colloquially speaking, it is called a trust fund for the rate payers?

The Witness: No, I don't think it is called that at all. In the first place it is not a fund and in the second place there is no trust.

Mr. Shuler: You said awhile ago it could not be paid out in dividends. I do not mean it is a trust. But they are sort of trustees for the public. It is not a legal trust, of course, not.

Commissioner Poor: Mr. Crunden, will either one of these methods you have outlined here on your Exhibits depreciation methods, provide a fund that will replace the Ford car with the Cadillac car?

The Witness: No, sir.

Commissioner Poor: Each one will provide a fund that will replace the Ford car with a Ford car?

The Witness: Providing that replacement is necessary.

[fol. 8305] Commissioner Poor: Yes, at the worn out period of the Ford car.

The Witness: Yes, example A will do that on Exhibit 15.

Mr. Shuler: As a matter of fact it will do more than that, won't it? It will more than do it?

The Witness: No, sir.

Mr. Shuler: That is on the hypothesis that there are no earnings for the accrued reserve as it goes from year to year.

The Witness: There are no earnings for the reserve because the reserve is an entry written with ink, on a book.

Mr. Shuler: Isn't it actually more than that?

The Witness: No.

Commissioner Poor: Just a minute. In your answer to my question you said example A on Exhibit 15 will provide a fund to replace the Ford car with a Ford car when the Ford car is worn out.

The Witness: I mean, Mr. Commissioner, that entries made on that basis will operate to retain in the undertaking amounts equivalent to the original cost of the Ford car as used up.

Commissioner Poor: Isn't that what you seek to do?

The Witness: Yes, sir, but the second Ford car might have a first cost different from the first Ford car, and in that event you would pay less or more for that second Ford [fol. 8306] car. In other words, this is not a proposition of replacement at all, but straight line depreciation which is retained in the business out of the revenue of the company, an amount equal to the loss on the original property that is retired. Now, if you take from the company's current funds certain monies and say for the sake of illustration, although, of course, you cannot earmark dollars, that this thousand dollars you assume to be the same thousand dollars of depreciation expense, then if the present price of the Ford car is a thousand dollars, you can substitute the second Ford car for the first Ford car in the manner I thought your question anticipated. But this is what I am getting at. If the Ford car has gone down to $800.00 the situation is changed. If it has gone up to $1200.00 it has changed. Depreciation has nothing to do with replacement.

Mr. Laylin: Isn't it a matter of capital replenishment or replacement?

The Witness: Yes, exactly. It is a question of—as a dollar is used up in rendering telephone service another dollar is retained in the undertaking to replace it over the life of any item of property.

Mr. Shuler: That is the straight line idea.

The Witness: The straight line idea is that between the time of the installation of a unit of plant and its retirement a certain cost of property is used up. Now, the object of the depreciation charges is to earmark as an expense, to earmark for expense and to prevent the net income of the [fol. 8307] company from being overstated.

Mr. Shuler: Now, supposing it happens that at the end of the replacement period the Ford car is $800.00 instead of a thousand. Then what happens as a matter of bookkeeping?

The Witness: You mean that the first Ford car costs a thousand dollars and the second one costs $800.00.

Mr. Shuler: Yes, sir.

The Witness: Why you take any funds that you have if you have any and go out and buy a Ford car.

Mr. Shuler: What happens to the bookkeeping proposition?

The Witness: On the original Ford car?

Mr. Kinnison: Now about that $200.00. Where does it go in your books? It would stay in the depreciation reserve, wouldn't it?

The Witness: No, sir.

Mr. Shuler: Where would it go?

The Witness: No, sir, for this reason. The original Ford car costs a thousand dollars and it stands debited to the plant account that much. The depreciation reserve by reason of charges to expense aggregating $1000.00 and credited with that sum. When you write off of plant account against the reserve account in the sum of $1000.00 you cancel both.

Mr. Shuler: It only costs you $800.00 to replace it?

The Witness: Replacement has nothing to do with it.

Mr. Shuler: You knock off a thousand dollars although [fol. 8308] it only cost you $800.00?

The Witness: Yes, we knock off a thousand dollars off of the plant account and the next day you go out and buy one at $800.00. Then you put that in at $800.00 and that account which stood yesterday at 1,000 stands today at 800.

Mr. Shuler: Where does the 200 go or where does the 200 show up?

The Witness: It shows up in whatever other assets the company might have.

Mr. Maltby: Your application of the straight line method then would not affect the capital account?

The Witness: On replacements?

Mr. Maltby: No, in any shape; the capital account would not be materially affected.

Mr. Burr: It would not be reduced.

Mr. Maltby: It would not be reduced by your application of the straight line method.

The Witness: No, sir, if I understand your question there is no connection there.

Q. In Mr. Shuler's example your capital account would have a Ford car at $800.00 and you would have $200.00 in some other form of investment, would you not?

A. Yes, sir, you would have it, in working capital.

Q. And that is what you had to start with, $800.00 plus $200.00 or a thousand dollars?

A. Yes, sir.

Mr. Shuler: That is right. Now, I want the converse [fol. 8309] of it. If he pays $200.00 more or $1200.00 that has to come out of something else?

The Witness: Yes, he must get other capital to meet that.

Q. In your bookkeeping you say that you apply the per cent of depreciation against the book figures; that is correct, isn't it?

A. Yes, sir.

Q. In estimating the reproduction cost or value of a property, what have you to say as to the correctness of applying the per cent of depreciation or the rate of depreciation to the reproduction cost?

A. You mean as a legal proposition, the propriety of it?

Q. Well, as a rate making proposition in connection with a rate case?

A. I should say the accounting relation to that was about this way, that the accountant necessarily keeps his books on the basis of cost, and everything on the books is on the basis of cost, whether it is plant or whether it is money or whether it is accounts receivable, and if he is going to show costs all the way through he must show depreciation on a cost basis.

Q. Right.

A. Now, whether you are going to use that method in a rate case is a legal question, that is, I do not feel competent to pass on it.

Q. The two are quite separate, aren't they?

A. Yes, in other words, one is purely an accounting question and the other one is not an accounting question. I presume it is a legal question. I don't know.

[fol. 8310] Mr. Shuler: Isn't it a question to get the most money?

The Witness: No, that would not be right. The thing might cut both ways. The question is what is a correct principle?

Mr. Kinnison: That first theory is the true theory of depreciation?

The Witness: Yes, sir, it is the correct accounting theory.

Mr. Shuler: If that is true, what is the value of all your accounting to the associated Bell companies, if it is not to be used in rate cases? How is it of value to the associated Bell companies?

The Witness: I do not see that the accounting is primarily for use in rate cases. I think the accounting is primarily for general purposes, and we have to keep books on the basis of accounts. Now, if the lawyers get into this proposition and decide they cannot use the books in finding fair values, but some other thing, I do not think the accountant can follow into that. That is their specialty.

Mr. Shuler: Who furnishes the Bell Company its accounting system and method so as to be able to present its cases for rate making purposes?

Mr. Burr: Are you talking now entirely to the point of depreciation?

Mr. Shuler: No, I am talking to the point that he says [fol. 8311] the General Staff is of great value to the associated Bell companies, and to demonstrate that he has gone on here for several hours to show this wonderful accounting system which they have devised, which — inestimable value to the associated companies.

Mr. Burr: Right.

Mr. Shuler: Now, he says it has no value to them at all for rate making purposes. Now, I ask him who gets up the accounting system for the Ohio Bell Company for the purpose of its rate making cases.

The Witness: Answering that question, I would like first to call your attention to the fact that I did not say they system was no good for purposes of rate cases. In answering the question I would like to say that the accounting system is of great value for rate making purposes and is the thing on which you should rely in rate making as to all matters affecting cost.

Mr. Shuler: I think we all agree to that, but your attorneys do not.

The Witness: I do not get the point exactly. If you will state to me what the difficulty is perhaps I can clear it up. I am trying to keep to the accounting which I understand and not get into some apparent legal difficulty about which I am not clear.

Mr. Shuler: Who sets up for the Bell Company the

theory of depreciation of reproduction cost rather than original cost?

[fol. 8312] Mr. Burr: Now, you are talking about rate cases?

Mr. Shuler: Is that part of your work on the General Staff?

The Witness: I do not think it is the work of the General Staff at all.

Mr. Shuler: I understood you to differentiate between the true accountant's theory of depreciation upon original cost and the theory that has been advanced in this case upon replacement.

The Witness: I did.

Mr. Shuler: Who supplies the system of accounts for the latter?

The Witness: There is no system of accounts for the latter, because as I say that is not an accounting question. To illustrate it in another way, without being a lawyer, I have had it *b*inned into me for a long time that the Supreme Court says that the utilities are entitled to a fair return upon the fair value of the property. They do not say you are entitled to a return on the cost of the property. I do not say yet what we have on our books is not the final criterion of the amount to which the fair return is to be applied. It may be the same as depreciation. I do not like to discuss it, because I am not a lawyer.

Mr. Shuler: But your method is the proper method of depreciation to keep the investment intact, is it not?

The Witness: Yes, sir. By investment I assume you mean there the book cost of the property?

[fol. 8313] Mr. Shuler: Right.

The Witness: Oh, yes, that is perfectly straight.

Commissioner Poor: But your method does not make any difference whether you start out with either reproduction value or cost value. Say your cost value is a thousand dollars and your reproduction value is $2000.00. Your aim is in one case to a fund of one thousand at the end and in the other case 2000 and your method would apply equally well in both cases irrespective of what you started out with?

The Witness: It would, Mr. Commissioner.

By Mr. Burr:

Q. So far as the method is concerned it is precisely the same, isn't it?

A. Yes, sir.

Com. Maullar: Mr. Crunden, just one little application of your depreciation theory. Suppose a pole line—we talk of poles because that is a familiar piece of telephone apparatus with which we are all acquainted—say a pole line known to be in the ground or having been established in position for ten years is appraised by an engineer and its per cent condition given as 90. Now, in applying your depreciation theory would you apply the straight line depreciation as applicable to that class of property the country over or to that specific property?

The Witness: Would you mind elaborating on that, Mr. Commissioner. I do not get your point yet.

Commissioner Maullar: You know in these rate cases we have what they call observed depreciation?

The Witness: Yes, sir.

[fol. 8314] Commissioner Maullar: They go out and appraise a line of poles that are known to have been in place for ten years.

The Witness: All of them?

Commissioner Maullar: Possibly such a line could be picked out.

The Witness: All right, we will assume it has been there for ten years, everyone of them.

Commissioner Maullar: Yes. Now, in the appraisal of that or in the application of your straight line depreciation would you apply it to the observed value of that line or to the straight line of that class of property the country over.

The Witness: You mean in arriving at the condition of the property?

Commissioner Maullar: No, in arriving at the value of that property, at the present value of that property.

The Witness: I am afraid that is an engineering question that I would not be competent to answer. To tell you the truth, I am not entirely clear about it, and it is outside the scope of my work.

By Mr. Burr:

Q. These charts——

A. May I interject a thought in there?

Q. Yes.

A. Is it this point you have in mind, Mr. Commissioner, that the accountant on the books may have charged up a

depreciation expense in several successive periods and the amount he may have charged up in say one third of the cost [fol. 8315] of the property, and when you go out and look at this piece of property to which the charges relate, its condition is better than 33⅓ per cent; is that the point involved?

Commissioner Maullar: Yes.

The Witness: That is what I was trying to discuss when I said that I think the depreciation affecting the physical property itself has its own characteristic curve, and the straight line procedure of the accountant is simply to draw a line from original cost down to salvage value by means of a straight line, such as you might make with a ruler, like the Czar of Russia made the railroad between Moscow and St. Petersburg. He drew a line with a pencil. He paid no attention to geographical conditions. That is what we do. We try to put in our amounts of depreciation in the several successive depreciation periods in which the property is in use and we do not try to make it conform to the actual condition of the property as it exists. The first and biggest reason for that—and there are two reasons—is that it is equitable to charge the depreciation expense in that way. There is no good reason anybody has ever brought forward against that method of conducting the accounting, and it has been the method that the Interstate Commerce Commission people have adhered to steadily since the first time they tackled this proposition. Now, the second reason is that the accountant could not be reasonably asked to find the condition of all the multitudinous [fol. 8316] articles in a telephone plant every year and make entries on his books. No person could do that without inventories and appraisals which are expensive. I don't know whether that covers the point.

Mr. Shuler: You do recognize observed depreciation as well as straight line depreciation?

The Witness: Yes, I recognize engineering depreciation, and I think that there we are talking about true depreciation, the way the word should be used, that is, as a lessening in value. But when you talk about depreciation in the accounting you are talking about the best method of writing off an operating expense.

Mr. Shuler: In a certain class of property?

The Witness: Yes.

Mr. Shuler: Mr. Crunden, may I——

The Witness: Just one more thought comes in.

Mr. Shuler: Oh, certainly go ahead.

The Witness: I think we should not be confused as to the relative importance of different things there. The fundamental fact is the property itself. It is for the sake of the property that the accounting exists and not the other way around, so that the prime side of this question is the property side, the engineering side and the Commissions and Courts have determined or are trying to determine the proper way of setting up the value of that property. Now, that is the controlling thing. Then comes the question of expense, and the depreciation expense is now being handled [fol. 8317] on this straight line basis, and it is a simple workable basis, it is equitable and should be continued and if there is any way that it can be changed that would fit in any better with the requirements connected with the property, it should be changed. But it cannot be changed because there is no better method.

Q. Mr. Crunden, in a growing telephone plant such as that of the Ohio Bell Telephone Company in Ohio, can you obtain the proper rate of depreciation by finding the relation of the retirement to the cost of plant in the year the plant was retired, or on the contrary should you not find the relation of the retirements to the cost of plant in the year when the plant which is retired, for example, was installed?

A. The latter method is unquestionably the correct method and the only correct method and the first mentioned method is erroneous and has no standing whatsoever.

Mr. Shuler: As I understand you, that is what your method does, doesn't it?

The Witness: No, sir.

Mr. Shuler: Didn't you tell me that when the automobile was retired at $1200.00 you took $200.00 more from capital, original capital and put it up into plant?

The Witness: Well, that is a different subject. I think if you would read that question and answer you would find that that was a different phase of the matter.

Mr. Shuler: I think we absolutely agree. I may not [fol. 8318] have made my question clear to you.

The Witness: Oh, I think that we are together about that

$200.00, yes, but I do not see how it ties in with Mr. Burr's question and my reply.

Mr. Kinnison: Mr. Witness, while ago you told me that the matter of putting aside an annual depreciation reserve was simply an entry?

The Witness: Yes, sir.

Mr. Kinnison: You mean to say actually the funds are not somewhere within the corporation for present or later investment?

The Witness: I mean that there is no dollars connected with the entry otherwise than in the sense that dollars are connected with any entry. That is to say, there is no fund, there is no tagging of dollars, no ear marking of dollars, but the charge to expense does operate to retain in the business of the company's revenues amounts equivalent to the charges certainly.

Mr. Kinnison: Then when you have completely amortized your depreciation on the automobile of a thousand dollars and you want to buy a new automobile for a thousand dollars where do you get that money?

The Witness: In order to make that a practical illustration, we will have to think of the Ohio Bell Company as a growing plant. Then we make depreciation charges in 1923 and as a result of that certain monies representing those credits are retained in the business. They cannot go [fol. 8319] through into surplus. Now, in the growing plant it is the desirable thing to use such working capital as you can spare to build additional property before you go out into the market to borrow additional money on securities or otherwise, so that we invest our working capital in plant just as fast as it accumulates. So new property tends to take the place of old property. Now, at a later date it is from that that this property is retired from service, and because it is a continuing business, other property must take its place. At that time we have made various expenditures for property previous to that time and we are able to go to the Commission and show that we have invested out of our own monies considerable sums——

Mr. Shuler: A part of it is depreciation reserve.

The Witness: A part of it is the money retained in the undertaking by reason of the depreciation charges, and we can then show that those expenditures have been made, and obtain permission to issue additional stocks and bonds.

Q. You earn on it, do you from the very time you begin to retire into the depreciation reserve, that is, it is set up in your capital account and reinvested for the business of the company in additions and betterments; it is available there for that purpose, isn't it?

The Witness: I didn't get your question.

(Question read.)

Mr. Shuler: Take your theory of a growing business, that all the money retained is retained for the purposes [fol. 8320] of the company.

The Witness: Yes, sir.

Mr. Shuler: And you invest it in the company itself?

The Witness: Yes, sir.

Mr. Shuler: And set it up as property which should earn?

The Witness: If it is invested in additional telephone property it should earn, yes, now, of course, coincidentally with that there is this condition. Here is property on one side of the street, we will say which represents the original property, and that property is depreciated. We have to make charges to expense on account of that property. We then find ourselves in possession of some additional working capital, assuming that the revenue has been sufficient to provide such capital. Now, we may take those monies and invest them on the other side of the street and give service to additional subscribers. When we come down at a later date to issuing some more securities or some more capital stock, it is immaterial whether the property is on one side of the street or the other so far as the issuance of those securities is concerend, so long as there is that additional property somewhere. While that is going on, we are not entitled to earn a return upon more than the fair value of the property in its depreciated condition both on the one side of the street and on the other. Does that answer the question of the A. T. & T. or the Bell Companies?

Mr. Shuler: I understand that answer.

[fol. 8321] The Witness: Yes.

Mr. Shuler: For how long has that been the policy of the A. T. & T. or the Bell Companies?

The Witness: Why I think that has always been the policy.

Mr. Shuler: You have been with them since 1910?

The Witness: Yes, sir.

Mr. Shuler: Aren't you familiar with Mr. Theodore Vail's

statement in the annual report of 1913, where he says that depreciation reserve is invested in extensions and therefore the subscribers get the benefit of it without any cost.

The Witness: Yes, I remember that and——

Mr. Shuler: Well, doesn't that——

Mr. Burr: Let him finish.

The Witness: I did. I say, "Yes, I remember that."

Mr. Shuler: You have just now said that what they do is, as this depreciation reserve grows and they invested in additional extensions, that you then go and have additional stock issued on it. Now, I ask you when this latter method was adopted.

The Witness: There isn't any conflict between those two things, and there is no latter method adopted. Mr. Vail as financial man talking to financial people and he phrased the thing in his own language. I am talking here about a sort of hybrid question of original cost and fair value which you gentlemen are trying to ventilate. It has been the general policy of the Bell system if we had our rates sufficient to take [fol. 8322] care of all our stock dividends and interest on bonds and advances and provide a reasonable margin for surplus, that we would not go out after increased rates even though we were not getting a full return to which we might be entitled, and that is Mr. Vail's point of view. When we get into a proceeding before the Commission and in the court and where we won't receive any consideration from the Supreme Court unless we adhere to those legal lines they have laid down, it is necessary to make proof on the basis of the value of the property, it is put in on that basis, but there is no conflict between the two. If we receive a fair return upon the fair value of the property, it ought to enable us to pay our interest and a fair dividend and set aside a reasonable margin or surplus to take care of those risks and contingencies that are over and above those you meet with in the operating expenses.

Mr. Shuler: But should it also be a sufficient rate to enable you to create a depreciation reserve upon which you could later issue stock dividends?

Mr. Burr: We do not issue stock dividends?

Mr. Shuler: That is what he said.

The Witness: Oh, no, no; that is something that is forbidden.

Mr. Kinnison: You mean to set it up as a capital asset upon which you can base the sale of stock, is that it?

Mr. Shuler: He said stock dividends.

[fol. 8323] The Witness: All I mean is this; that is certain property that is covered by the initial securities let us say; now that property is deteriorating, depreciating if you like to call it so. As your depreciation progresses it places a limit upon the fair value of the property. Now, we are not entitled to earn upon more than the fair value of the property as it exists from time to time in its depreciated condition. At the same time that the actual physical deterioration is under way we are making entries upon our books upon a straight line basis, amortizing, so to speak, to use the chairman's term, the original cost of that property. That retains in the business working capital. We invest that working capital in additional property from time to time. It is our money. We build property with it and the property is our property. It immediately is placed in public utility service. It is subject to the same fair value rule as the original property, and we are entitled to a fair return only upon the original value of it. Now, the depreciated value of the original property and of the property constructed from time to time out of the company's working capital represents our assets. That is what we earn on. And then we have to turn around and face in the other direction and meet the investors in the business and pay them out of that fair return the necessary dividends and interest to satisfy them and to keep up the flow of new money into the business for extensions and additions.

Mr. Laylin: Assuming a certain amount of capital to [fol. 8324] start with, then when you have established this depreciation reserve and have reinvested that in extensions and betterments of the property, then the depreciated value of those extensions and betterments, plus the depreciated value of your original capital investment in plant, should equal only the original cost, should it not, of the property?

The Witness: No, sir.

Mr. Laylin: Why not?

The Witness: That looks like a fine proposition at first blush, but when you dig into it you find it is not so good.

Mr. Shuler: For whom?

The Witness: As an economic proposition, I mean. The question is whether you are going to make the primse side of this question the property side or whether you are going to make the accounting rule swing the whole thing. It is a fact, and I have so stated it that the decline in value of prop-

erty due to observed deterioration does not coincide with the progress of straight line depreciation. Now, here comes along a proposition which Mr. Laylin mentioned. It assumes to make the two things coincide and it does so apparently by the very violent method of chan-ing the fair value of the property to conform to a mathematical accounting procedure. Now, without becoming too much of a lawyer again it seems to me evident in deciding that the corporations are entitled to a fair return on a fair value of their property, the Supreme Court must have been moved by the [fol. 8325] fact that it is that fair value which then and there exists in point of present economic fact. As I said before I think the property is your prime side of this thing and the accounting merely exists for the sake of the property. Here comes this proposition which seeks to harmonize the two things by setting aside the actual facts, the legal facts, and making the whole proposition conform to what you find on the books. Now, it is notorious, everybody knows it, that the accounting for depreciation has been neglected by corporations in the past. Generally, by the Bell system companies depreciation accounting has been good, but generally by Public Utilities Companies it has not been good. Some companies have the proper reserves, others have small reserves, others have none at all. Undoubtedly the reserve could only be deducted from the full amount of the property, which is what this gentleman's proposition amounts to, providing it had been earned; but who shall say whether or not the reserve has been earned when the facts are usually in dispute? In other words, your proposition raises more difficulties than it disposes of. It gets away from a reasonable basis for fair value on the economic side and it does not have any offsetting advantage.

Mr. Laylin: Shouldn't the only variable be in the value of the property from year to year, the appreciation?

The Witness: It might be a decreased value.

Mr. Laylin: Shouldn't that be the only variable there, answering that question? Otherwise, shouldn't they coinside? [fol. 8326] The Witness: No, because there are influences at work on property besides depreciation. You must remember there that there is depreciation in the economic sense as well as the engineering and the accounting sense. When you say, for instance, that a certain thing is appreciable, as for instance, commodities have been appreciating since the war and money has been depreciating, there you

are talking about a very different kind of appreciation than in these other subjects. When there is too much money or when there is a great increase in money without, of course, their necessarily being too much, when there is more money let me say relative to commodities than there was before, it tends to depreciate money, because there is a great supply of money compared with the same amount of commodities, and when that happens the holder of commodities are more fortunate than the holders of money. On the other hand, if large stocks of money are withdrawn, and the amount of commodities remains the same, then the holders of money would be more fortunate than the holders of commodities. Those influences are at work on the fair value of the property all the time, and they have absolutely nothing to do with the bookkeeping or the depreciation.

Mr. Dotson: I find myself in a predicament with reference to the further hearing here that may make it impossible for me to be present. I may see my way clear to be here tomorrow morning. I am going to do some telephoning if the company will permit me to see if I cannot extricate my- [fol. 8327] self from engagements so as to be here tomorrow. If not, I was desiring to know if possible we could at this time fix the date for the next hearing on this matter. It occurred to me it might be possible to do that. How many witnesses will you have?

Mr. Burr: Three or four. The Commission at the previous hearing in this case set aside the week of March 24th for further proceeding, so that the matter is already taken care of.

Mr. Dotson: All right.

Commissioner Poor: That week was set, not for cross examination of these witnesses produced at this hearing. That was for the further hearing in the toll case.

Mr. Burr: We are in the toll case now.

Commissioner Poor: I know but it was not necessarily set aside for the cross examination of these witnesses.

Mr. Dotson: Do you think that the cross examination would come prior to the week of the 24th?

Commissioner Poor: I think, Mr. Dotson, we had better wait until the conclusion of this session of the hearing to set that date, and we will be sure to notify you as to whatever date is set.

Mr. Burr: My own notion that we might be able to suit all of these gentlemen here, and the Commission would not

have to have the witnesses who have been testifying this week back here on that date, but whatever is satisfactory to the Commission is satisfactory to us.

[fol. 8328] And thereupon the further hearing of this matter was adjourned to Friday Morning, February 29, 1924.

[fol. 8329] Friday Morning Session

February 29th, 1924.

And also C. S. Eaton, called as a witness on behalf of The Ohio Bell Telephone Company, being first duly sworn, testifies as follows:

Examined by Mr. Burr:

Mr. Burr: In explaining why I am calling Mr. Eaton at this time, counsel will recall Mr. Crunden was on the stand when the session closed yesterday afternoon and that he was not excused from further testifying. We expect to call him later on in the day, but inasmuch as Mr. Eaton is here from a distance and would like to get away as soon as possible, I ask your indulgence in the matter of interrupting Mr. Crunden's testimony and calling Mr. Eaton at this time.

If there is no objection I will proceed with the examination.

Q. Will you please state your name?
A. C. S. Eaton.
Q. Where do you live, Mr. Eaton?
A. Cleveland.
Q. What is your age?
A. 40.
Q. How long have you lived in Cleveland?
A. 18 years.
Q. What is your occupation at the present time?

[fol. 8330] A. I am a member of the investment banking firm of Otis & Company, and Chairman of the Board of The Continental Gas & Electric Corporation.

Q. What experience if any have you had with public utility companies and particularly in the matter of financing public utility companies in times past?

A. I have been interested in the operation of electric light and power and street railway companies since 1906 and my firm has financed bond issues particularly and pre-

ferred stock issues for a great many electric light and power, gas and street railway companies.

Q. When did you join the firm of Otis & Company?

A. 1913.

Q. Between the years 1906 and 1913 what was your particular connection with public utility properties, if any?

A. I was associated with the Washington, Baltimore & Annapolis Electric Railway, and with the development of light and power companies in the Middle West.

Q. Have you had any experience in the financing of telephone properties in the State of Ohio?

A. Yes, our firm was one of the bankers for the Ohio State Telephone Company and for the Independent companies that went into what later became the Ohio State Telephone Company.

Q. In that capacity did your firm finance any of the requirements of the Ohio State Company or the other companies constituent to the consolidation which resulted in the formation of the Ohio State Telephone Company?

A. Yes, we took an active part in the buying and re- [fol. 8331] selling of the securities of those various companies.

Q. Were you at that time associated with your present firm?

A. Yes.

Q. Has your firm offices in any other City of the United States except the City of Cleveland?

A. Yes, we have offices in Columbus, Cincinnati, Toledo and Akron in Ohio. We have offices in New York, Detroit and Denver.

Q. What is one of the primary purposes for which your firm is organized?

A. Our main business is the buying of the securities of Ohio companies and the redistributing of those securities to investors.

Q. Now when you speak of the buying of securities, do I understand you to mean the purchasing of a large block of securities issued by the utility or other industry and then the disposition of those by sale in the market to customers generally?

A. Yes, that is exactly it.

Q. In other words, you are a purchaser in wholesale lots of the securities of such industries?

A. Correct.

Q. What has been the average amount of securities financed by your house for public utilities and other industries during the past few years?

A. That would average a hundred million dollars a year.

Q. Are you familiar with the financial market for the securities of such utilities, among others, as The Ohio Bell Telephone Company?

A. Yes, I am familiar with the market on that company's securities.

Mr. Kinnison: What is that question, please?

(Question read.)

A. The answer is yes.

[fol. 8332] Q. Are you familiar with the conditions upon which such securities are issued, and by that I mean with respect to the investment on the one hand and the amount of securities which can be reasonably issued and the cost of the money represented by the securities to the utility on the other?

A. Yes, that is my business.

Q. Are you familiar with the business and the general results of operation of The Ohio Bell Telephone Company in Ohio?

A. Yes, I am familiar with their statements.

Q. Based upon your knowledge of the property of that Company, the results of its operations from the standpoint of earnings and upon market conditions for securities of such a company as those conditions have prevailed during the past year and in recent times, what will you say as to the minimum amount which such a corporation, such a public utility, should earn on the fair value of its property in order to attract capital to the industry or the enterprise?

Mr. Dotson: Just a moment.

Mr. Kinnison: We object.

Mr. Dotson: We object to that question. That is for the Commission to determine.

Commissioner Poor: Read it, will you, please?

(Question read.)

Commissioner Poor: While that is the province of the Commission——

Mr. Shuler: I don't hear you.

Commissioner Poor: While it is the province of the Commission to decide that, the Commission must get some [fol. 8333] information some place, and we think this financial man may express his opinion on that matter.

Mr. Dotson: However, this witness has not yet, we believe, qualified sufficiently to make a statement of that kind. He made some general statements as to some knowledge he may have had of these properties in this and other respects, but thus far we believe his qualifications are wholly lacking to pass upon a subject of this kind. He is Mr. Burr's witness, and of course we are listening to the matter and if he has not qualified him we are not to blame, but we do claim the privilege of halting testimony of this kind where that seems to be lacking.

Commissioner Poor: You mean that he is not qualified sufficiently in the actual operation of a utility—on that phase of it? Or maybe the financial end, his connection with the financial house and familiarity with the matter?

Mr. Dotson: In both, for that matter. We cannot conceive how he could testify competently without knowing both.

Mr. Kinnison: Another proposition. The question is misleading. The question is based upon probable values, not upon investment.

Mr. Burr: It is not misleading. It is intended to be just as it is. I mean just exactly what I said.

Mr. Kinnison: Then you are making a rate expert out of a securities man.

Mr. Burr: I am not. I am asking him from the stand-[fol. 8334] point of a banker and with his knowledge of financial conditions and the property of this company and the results of its operation what, in his judgment, is the minimum amount which the company must earn on the fair value of its property in order to attract capital to it. It is the customary question which has been asked over and over again in the rate cases. It is part of the evidence on which courts have from time to time commented, and if there is any question as to the necessity for further qualifying the witness I can very readily ask him some more questions to satisfy the gentlemen on the other side.

Mr. Shuler: My objection to the question is the same as what Mr. Kinnison has suggested. This gentleman sells stocks on which dividends are paid or not paid, and those

dividends are paid on the stock and not on the fair value of the utility.

Now take The Cleveland Illuminating Company. That stock sells on the dividends it pays and not on its value today or tomorrow. And Mr. Eaton does not represent to anybody that its value today is so much and tomorrow it will be so much and the next day it will be some other sum. He simply represents to his clients that here is a stock $100.00 par on which the company over a period of years has been paying a rate of return of so much.

Mr. Burr: You seem to know a good deal about Mr. Eaton's business and what he tells people. I think before the Commission accepts any such statement as that the witness should be put under oath.

[fol. 8335] Commissioner Poor: Never mind the colloquy between counsel. We have been getting along here nicely. Do you mean to say, Mr. Shuler, that you don't think that the financial world takes into consideration the value behind the stocks and securities——

Mr. Shuler: Oh, the assets are——

Commissioner Poor: As well as the dividends that are being paid?

Mr. Shuler: Oh, yes, and they take into consideration the character of the community. For instance, a man would not invest in a power plant in the wilds of Texas,——

Mr. Burr: He does some times.

Mr. Shuler: Where he would in a settled community like Cleveland. But my point is, here is the rate of return put upon the fair value of the utility, and it is unfair to the investor or any one else, because in the fluctuation of prices what might be the value of the utility today would not be the value of the utility tomorrow, and the investment banker I think realizes that. And I don't believe that he says to his clients that this is a splendid value, and you will notice that on all of their statements they directly call the attention of the investor to the fact that "While we believe these statements to be true, we do not guarantee them."

Mr. Burr: Are you quoting from the record?

Mr. Shuler: I am quoting from Otis & Company's advertisements. So it is what should be the return paid on the stock; that is the thing; not the fair value of the [fol. 8336] utility. And Justice Brandeis in the recent

case last summer in his opinion held it was the prudential investment in the Georgia power case.

Mr. Burr: Suppose the amount of stock issued against the property were five times the value of the property?

Mr. Kinnison: Exactly, and then you have the investment feature of it as against property values. That is my objection.

Commissioner Poor: The Commission feels that the question is proper, and if this witness is qualified to answer, it is up to the Commission to give what weight the testimony may deserve.

Mr. Dotson: May I make this further suggestion though in connection with the examination of this witness? Mr. Burr is asking him generally about utility securities. I think it is fair to know what kind of securities he is talking about now. Is he talking about bonded securities or about stock issues?

Mr. Burr: I did not ask him anything about stock issues.

Mr. Dotson: What did you ask him?

Mr. Burr: I asked him what rate the utility must earn, and I referred specifically to The Ohio Bell Telephone Company, the minimum rate on the fair value of its property, to attract capital to the enterprise, and said nothing about stocks and bonds.

Commissioner Maullar: Neither did he ask him what is the fair value.

[fol. 8337] Mr. Burr: Not at all, sir.

Commissioner Maullar: Whatever the fair value is found to be, what should be a fair rate of return on such a utility.

Mr. Kinnison: Capital in whatever form, as preferred stock, bonds or common stock?

Commissioner Maullar: That can be brought out.

Mr. Kinnison: We object to that and ask that the question be made sufficiently definite to enlighted the witness and counsel.

Commissioner Poor: The objection is overruled.

Mr. Kinnison: Note an exception.

Q. You may answer the question.

A. It is my best judgment that a utility such as The Ohio Bell Telephone Company should earn a minimum of eight per cent on the fair value of its property after proper charges for depreciation and obsolescence.

Q. Is that one of the questions which your house considers before undertaking to finance the securities of an industry?

Mr. Kinnison: I object. It is cross examination.

Mr. Burr: You are objecting to the lack of qualification.

Mr. Kinnison: That does not qualify him. That is an expression of his own opinion.

Mr. Dotson: There is possibly a great difference between what their house does and what is customary.

Commissioner Maullar: Isn't the question directed, to [fol. 8338] what his house does?

Mr. Kinnison: Yes, entirely so. The fact that his house does it does not make it weaker or stronger.

Commissioner Maullar: That is for the Commission to determine.

Mr. Kinnison: I object.

Commissioner Poor: The objection is overruled.

Mr. Kinnison: Note an exception.

Q. Is one of the things which you consider the fair value of the property involved?

A. Yes.

Same objection by counsel for the Cities; objection overruled; exception by counsel for Cities.

Q. Is one of the things which you consider the earnings of the industry during a period of years?

And thereupon counsel for the Cities objected to the above question; objection overruled; exception by counsel for the Cities.

Mr. Kinnison: Let the record show an objection and exception to all these questions.

Commissioner Poor: It will be understood that this line of testimony is objected to.

Q. Have you taken those things into consideration in answering eight per cent as you have?

A. Yes.

Q. Assuming, Mr. Eaton, that The American Telephone & Telegraph Company, as a part of the financial service of that Company to the Ohio Bell Company, loans the latter company on notes, on short notes, money with which to finance its capital expenditures, would you or would [fol. 8339] you not—and I am not asking you to place a

value on it—would you or would you not consider that an element in favor of The Ohio Bell Telephone Company with referecne or with regard to its financial status?

Mr. Dotson: Hold on. We object.

Mr. Burr: The question may be withdrawn at this time and I will take it up a little later.

Q. Have you in your possession the annual report of The Ohio Bell Telephone Company to its stockholders?

A. Yes, sir.

Mr. Shuler: Which one?

Q. Have you examined the statement of the financial operations of the Company for the year 1923, contained in that report?

A. Yes, sir.

Mr. Kinnison: Have you a copy of it, Mr. Burr?

Mr. Burr: Have we more copies?

Mr. Shuler: I thought some one told me that report was not out yet.

Mr. Burr: It has been out for quite a while.

Mr. Maltby: You are thinking about the annual report to the Utilities Commission.

Mr. Kinnison: What is this report?

Mr. Burr: The report of the stockholders. We will get copies for you, Mr. Kinnison, and will pass this one around after Mr. Eaton has testified, if you want it.

Q. Based on that statement, Mr. Eaton, what will you say as to whether or not The Ohio Bell Telephone Company is, in your judgment, entitled—and I am asking you [fol. 8340] for your judgment as a banker—to any current bank loans? And you may give reasons for your answer.

Mr. Shuler: I object, because Otis & Company are not bankers in the sense you are using it, Mr. Burr, and the Supreme Court of Ohio, Mr. Eaton, decided that you were not entitled to use the word "banker" on your stationery; am I correct, Mr. Eaton?

The Witness: Yes, that is a fact.

Q. Mr. Eaton, are you familiar with banking conditions in the City of Cleveland?

A. Yes.

Q. To what extent do you have dealings with National and other banks in that city?

A. I am a director of The Cleveland Trust Company, and active in its matters, especially its committee that has to do with the making of loans.

Q. What is The Cleveland Trust Company?

A. It is a bank having a capital and surplus of 13 millions, and deposits of 182 millions.

Mr. Shuler: We are very proud of them in Cleveland.

Q. Does that bank ever loan money to public utilities?

A. Occasionally.

Q. Does the question of whether or not such loans shall be made come within your jurisdiction as a member of the Board of that bank?

A. Yes, I am consulted on such loans by the bank.

Q. Very well. Now based upon the statements referred to in the annual report of The Ohio Bell Telephone Company——

Mr. Kinnison: To its stockholders.

Q. To its stockholders——

[fol. 8341] Mr. Kinnison: Singular.

Q. Will you say whether or not in your judgment that company is entitled to any current bank loans?

Mr. Kinnison: I object to the question.

Commissioner Poor: Overruled.

Mr. Kinnison: Note an exception.

A. It is a fundamental principle of good bankers that the current loans are made only on such operations as may be liquidated in the ordinary course of the borrower's business. That has led to a well-established rule that a bank does not voluntarily loan money to a company unless the quick assets of the company are at least double their quick liabilities. Because of that fundamental rule in banking—and whenever that rule is departed from it leads to disaster in a bank, as illustrated by the bank failures which we recently had in the West—the depositor may ask for his money suddenly in large quantities or small, and a bank has to be in a liquid position if it is to stay in business. The result is banks do not make commercial loans except transactions that can liquidate themselves in the normal course of business. That condition does not obtain in the case of

The Ohio Bell Telephone Company. It has quick assets as of December 31st, from a banker's point of view, of roughly, $4,000,000.00—I beg your pardon—roughly just in excess of $3,000,000.00.

Mr. Dotson: What do they consist of?

Mr. Burr: Wait a moment. Let him finish his answer.

Mr. Kinnison: We are handicapped by not having a [fol. 8342] copy of the exhibit.

The Witness: I think I have this fairly well in mind.

Mr. Kinnison: We do not want to take it from you if you want to use it.

Commissioner Poor: Go ahead. Let this witness continue and then you may ask questions on this point at the conclusion of his answer.

The Witness: The Company has quick or current assets as of December 31st, of just over $3,000,000.00. Its quick liabilities as of that date are over $4,000,000.00. Therefore the Company, from any well-run bank, would not be entitled to an open line of credit.

Q. In your judgment are the earnings of the Company sufficient to justify a mortgage bond issue of any size?

Mr. Dotson: I object to the question.

Q. And by "any size" I mean, for example, $10,000,000.?

Mr. Kinnison: You mean giving it seniority to your preferred issue?

Mr. Shuler: Of course it would have to.

The Witness: Yes, sir.

Q. That is, you say the earnings——

Mr. Burr: Read the question. I don't think he got it.

(Question read.)

Q. That is to say, a mortgage bond in addition to the outstanding obligations of the Company.

Mr. Kinnison: What do you mean by that?

[fol. 8343] Mr. Shuler: How can you have a mortgage bond issue that does not come ahead of other liabilities except other mortgages?

Mr. Burr: That is what I am talking about. Let us get at it this way.

Q. What are the obligations of The Ohio Bell Telephone Company in matter of bonds and notes at the present time as shown by that statement?

A. $22,651,000.00.

Q. Have you calculated the present amount of interest payable on that indebtedness?

A. Yes, that, speaking from memory, amounts roughly to $1,400,000.00 a year.

Q. How much had the Company available for interest as shown by that statement?

A. They had available for interest after deducting the item of rent about three million eight.

Q. That would be about how many times the interest charges?

A. That is about 2¾ times the present interest charges.

Mr. Dotson: Pretty good shape.

Q. On such a showing, Mr. Eaton, could the Company, in your judgment—on such a showing, what amount of bonds, Mr. Eaton, could the Company in your judgment expect to be able to issue and dispose of in the market?

Mr. Dotson: I object. There is nothing here to show that that can in any way be material in a case of this kind because that is directed, if it is directed to anything at all, to its ability to borrow money beyond that which it has already borrowed. Now the question and the answer can [fol. 8344] in no way, it seems to me, throw any light upon the question whether that is a legitimate necessity in the case and for what reason that legitimate necessity exists and whether the inability is due to an improper adjustment of rates and income. There is nothing about it that can in any way relate to this case.

Mr. Burr: Your Honors, Mr. Cooper has already referred in his testimony to the financial service rendered this Company by the American Company. When Mr. Crunden resumes the stand we expect to show how this Company is enabled to finance itself through the assistance of the American Company. We expect to show by this witness that it could not finance itself any other way. We expect the testimony to show that with the Company's financial condition as it is it could not possibly borrow even on a bond issue sufficient money to meet its construction needs for the current year. And that is one of the purposes of this tes-

timony, not only to show that the Company could not do that unassisted, but also to show the value of the financial services to this Company which it receives from the American Company. It is a matter which has been proven time and time again and reflects directly upon the value of the service of the American Company under the license contract.

Mr. Shuler: Just a word. This witness has not shown any hostility, and therefore I don't think Mr. Burr should be permitted to cross-examine him. The witness has answered his question. Mr. Burr said, "On that statement [fol. 8345] is it possible to issue $10,000,000.00 worth of mortgage bonds?" And the answer was "Yes." Now why cross-examine your witness?

Mr. Burr: I am not cross-examining him.

Mr. Shuler: He has answered your question yes.

Commissioner Poor: The Commission would like to know whether that answer was just an unlimited answer. We want to know whether they would be able to borrow ten million additional or whether the ten million would take preference over the outstanding?

Mr. Shuler: The witness says these earnings are after taking care of everything, and answers on that statement of earnings after taking taking care of those things they would be justified in issuing, and ten millions of bonds could be sold.

Mr. Kinnison: Don't we have a right to know the seniority of the various issues? We haven't the information on which to know what he is going into.

Commissioner Poor: That is not clear in my mind. I think the testimony of the witness on this line is competent, going directly to the value of the services rendered by the A. T. & T. to the Ohio Bell, and whether they justified the payment by the Ohio Bell to the A. T. & T.

Mr. Burr: Read the last question.

Mr. Dotson: Just a word more. It seems to me that this fact should be considered, that it is in evidence already that the A. T. & T. Company, who owns these associated companies——

[fol. 8346] Mr. Burr: The stocks of them, you mean—the common stocks?

Mr. Dotson: Yes, we understand that. I am cutting across lots in stating the facts—that it has organized the

companies and related these associated companies to itself in a way suited to its policy and general plan of providing for the needs of these associate companies, not only from an engineering and the management and construction standpoint, but also from a financial standpoint, and they are weaving into the record here the fact that the parent company is prepared to finance these subsidiary companies.

Mr. Burr: Exactly so.

Mr. Dotson: And these subsidiary companies are therefore deprived of the right and privilege of financing themselves. In other words, the American Company takes over the credits of these subsidiary companies and floats the credits of these companies, and it proceeds according to its own methods and its own arrangements to do that very thing.

Now when we get into this question this Commission is asked to provide the funds necessary from the rates that are charged to enable the American Company to finance the credits of the associated companies.

Now we claim that that is carrying it too far, that if these companies are to be dealt with upon the basis of their own credits, through their own means of financing those credits, then of course we would recognize that we were within the broader line of reason. But when we attempt to go beyond [fol. 8347] that and to bolster up the financial scheme of the American Company, which is not before this Commission and cannot be before this Commission in any of these rate cases that pertain to the prices of this service, we are going too far.

Mr. Shuler: I just want to call the Commission's attention to one thing. We have been promised a copy of this 4½ per cent contract, and it has never been turned over, but I have a copy of the contract as it existed in 1920, and Section 6 of that contract provides that The Cleveland Trust Company shall not borrow money for any purpose without the consent of The American Bell Telegraph Company. They could not borrow in the market if they wanted to without the consent of The American Telephone & Telegraph Company. Now I have not seen the contract of today, so I don't know about that. So why take up a lot of time on the value of this when the fact is The American Telephone & Telegraph Company won't allow them to borrow money outside?

Commissioner Poor: The question at issue is, is there any value in the services rendered. And the mere fact that the A. T. & T. owns the stock does not deprive them of the right to be paid for their service, just as an individual who is a stockholder in a company and may be president of the company, the fact that he owns the stock does not preclude him from the right to be paid for the service which he renders to the company. The mere fact that the A. T. & T. owns the stock of the Ohio Bell would not prevent them from receiving a fair compensation for a necessary service. [fol. 8348] Mr. Kinnison: Does the commission realize that this financial contract permits a financing charge to be made?

Commissioner Poor: That may be brought out.

Mr. Kinnison: He is really asking him to say whether it would stand two financing charges or not.

Commissioner Poor: You may proceed with the examination.

Mr. Kinnison: Note an exception.

Mr. Dotson: I would like to have it appear in the record that the license fee that is paid by the associated companies covers, as is claimed by the American Company, the responsibility or duty upon the American Company to finance these associated companies. The local companies are paying for that requirement. Now any order that this Commission, or any consideration that this Commission may give to the question of financing the Company's needs is a question of how far the rates must be fixed in order to enable the American Company to do this financing. In other words, we are working out a financial scheme for the American Company, not for the local company, because that is taken care of, as far as the local company is concerned, in the license contract. It is paying for it right now.

Commissioner Poor: It resolves itself down to whether the payment made by them is a reasonable price for financing; whether they do it through the A. T. & T. Company or a set of bankers.

Mr. Dotson: The A. T. & T. has taken over that responsi- [fol. 8349] bility, as has been pointed out here, and it is denied the right to do anything else.

Mr. Cooper: It is not denied that right.

Mr. Dotson: Doesn't the same contract exist throughout the State?

Mr. Cooper: No, it does not.

Mr. Burr: No, that is not the fact.

(Question read.)

Mr. Kinnison: We object to the question in the light of the fact that the question does not supply the witness sufficient information in regard to the securities to give an intelligent answer.

Commissioner Poor: The objection is overruled. Those facts may be brought out in your examination, whether in addition to the present outstanding obligations that could be done.

The Witness: On the earning shown here, the Company, in my judgment, could issue a maximum of 25 millions of long-time debt. It now has outstanding $22,651,000.00 of such debt. And therefore, in my opinion, it would be entitled to sell, on its earning showing, an additional two to two and a half million dollars of bonds.

Q. That is all?

A. Yes.

Q. Are you familiar with the general position of The American Telephone & Telegraph Company with reference to the financing of The Ohio Bell Telephone Company?

A. Yes.

Q. Does the fact that the American Company has asso- [fol. 8350] ciated companies and that The Ohio Bell Telephone Company is one of those associated companies constitute, in your judgment, any element to be considered in connection with the financing of The Ohio Bell Telephone Company?

Mr. Dotson: I object to the question.

Commissioner Poor: I think the objection is well taken.

Mr. Kinnison: You are giving us an objection and exception as we go through this?

Q. Suppose that The Ohio Bell Telephone Company were to attempt to refund and pay off the $12,000,000.00 of its outstanding notes as shown in that statement——

Mr. Shuler: May we, for the purpose of clear understanding, know whether those notes are secured or unsecured obligations?

Mr. Burr: They are unsecured.

Mr. Dotson: Are those the notes The American Telephone & Telegraph Company have of the Bell?

Mr. Burr: They are the notes of The Ohio Bell Telephone Company to The American Telephone & Telegraph Company for moneys advanced by the latter Company to the Ohio Company.

Mr. Dotson: And those notes then are floated with the guarantee of the American Company?

Mr. Burr: Not at all, so far as I know, not at all. They are simply the notes of The Ohio Bell Telephone Company to the American Company, and which the American Company owns and holds against the amounts of money repre- [fol. 8351] sented by those notes loaned by the American Telephone Company to the Ohio Bell Company for corporate purposes.

Mr. Snook: What was the amount of the notes?

Mr. Burr: Approximately $12,000,000.00. Now go back to the question.

Q. Suppose that The Ohio Bell Telephone Company were to refund the $12,000,000.00 of notes referred to and that thereafter the Ohio Bell was to be entirely independent of The American Telephone & Telegraph Company, no contractual or other relations between them, and that that would therefore require the Ohio Bell Telephone Company to finance itself, what, in your judgment would be the cost to The Ohio Bell Telephone Company for securities sufficient to refund that amount of notes?

Mr. Kinnison: I object to the question.

Mr. Burr: Of course you would. You don't like it.

Mr. Kinnison: Taking the hypothesis of a company whose financial structure has been wrecked, whose credit has been wrecked.

Mr. Burr: What are you talking about? It seems to me it is time we got to some kind of a basis.

Commissioner Poor: That is one of the matters that the Commission is interested in hearing from this financial expert, as to the reasonable charge for financing a thing of that kind. He claims that they do that.

Mr. Dotson: I did not object, but it seems to me that this element enters into it, that there is nothing to show that there would be any such financial policy. On the contract [fol. 8352] the record bears out that the same financial policy will be continued hereafter. That being the case how could testimony of this kind really be of any pertinency, because it should relate itself to the policy that obtains, the

conditions that will prevail in handling the credits of this company. Now the other is purely a theoretical matter that will never happen.

Mr. Burr: And ought not to, ought it?

Mr. Dotson: No, it should not, because that must be the case. That is why I am making the statement I am. Why not consider conditions here before us which are continuing to be the conditions which the Commission will have to deal with? That is my contention: not something that the Commission will never need to deal with; neither will the companies need to deal with; It is not of any value to you to know that. It is not of any value to the Commission to know it.

Commissioner Poor: The Commission will permit the question.

Q. The Commission says you may answer the question. Do you want it read?

A. No. In the most favorable money market the cost of that money under existing conditions here, the cost of the money would be not less than seven per cent, and in an average money market would be seven and a half per cent.

Q. Mr. Eaton, to raise an additional ten million dollars, that is to say, additional to the twelve millions of dollars, in the present market and under the condition outlined, [fol. 8353] what in your judgment would be the cost of that money to The Ohio Bell Telephone Company

Mr. Shuler: I object to the question:

And thereupon the Commission overruled the above objection.

Mr. Shuler: Note an exception.

A. At least eight per cent.

Mr. Burr: At this point we offer in evidence a copy of the agreement between The American Telephone & Telegraph Company and The Ohio Bell Telephone Company, dated the 26th day of March, 1923, it is the so-called license Contract now in effect between those two companies. It may be marked for identification Company Exhibit No. 1.

If counsel requires further identification of the agreement we will ask Mr. Eaton to stand aside, but I assume they will take my statement for the fact that that is the existing contract?

Mr. Shuler: If you say that.

Mr. Harshman: Are there any modifications of it?

Mr. Burr: None whatever. There are no modifications to this.

Mr. Cooper: That is the contract in effect.

Mr. Shuler: You have no letters written between you since, changing it?

Mr. Burr: No.

Mr. Shuler: It is understood that that is the present contract?

[fol. 8354] Mr. Cooper: That is the present contract.

And thereupon the Contract above referred to was marked for purposes of identification and was offered and admitted in evidence on behalf of The Ohio Bell Telephone Company and is herewith submitted, marked Company Exhibit No. 1, and made a part hereof.

Q. Will you please refer, Mr. Eaton, to Page 11 of Company Exhibit No. 1, which is the License Contract, and particularly to Paragraph D on that page, and continuing on page 12, and tell the Commission whether or not you have considered the services rendered by that paragraph?

A. I have.

Q. With the financial assistance of the American Company outlined in that paragraph available to The Ohio Bell Telephone Company, what will you say as to the saving to The Ohio Bell Telephone Company through its ability to secure capital from the American Company, savings in the matter of working capital, in connection with the construction program of The Ohio Bell Telephone Company?

Mr. Shuler: I object to the question.

Commissioner Poor: Basing his answer on the condition of the Company as disclosed in this report?

Mr. Burr: Yes.

Commissioner Poor: The objection will be overruled.

Mr. Shuler: Note an exception.

[fol. 8355] The Witness: There is a very great saving to the Ohio Company in the working capital furnished by the present company.

Q. Will you illustrate?

Mr. Shuler: I move that the answer be stricken out.

The Witness: In my judgment, perhaps I should say.

Mr. Shuler: As modified.

Commissioner Poor: For indefiniteness?

Mr. Dotson: It is wholly indefinite.

Mr. Kinnison: It is meaningless.

Mr. Dotson: It does not disclose anything.

Mr. Burr: It is not meaningless.

Mr. Kinnison: Because you are satisfied?

Mr. Burr: Because the answer is responsive to the question. We cannot make our case all at once. I have asked him what is the result. If you give me time enough I propose to ask him to evaluate that savings.

Commissioner Poor: Unless it is cleared up of course it may go out.

Mr. Kinnison: Note an exception.

Q. On the basis of expected loans to The Ohio Bell Telephone Company from the American Company in the sum of $4,000,000.00 for the year 1924, in addition to the amount of the loan by the American Company, what, in your judgment, will be the saving to the Ohio Bell Company as the result of the arrangement referred to in the contract?

Mr. Kinnison: I object. It is a hypothesis unsupported [fol. 8356] by any evidence.

Mr. Burr: We will show by a later witness that that will be the requirement of the Ohio Bell Company from the American Company for this year, and the only reason we have not already shown it is because we wanted to call Mr. Eaton and allow him to go. If the hypothesis fails, of course the question and answer fail.

Commissioner Poor: Well, in that question, Mr. Burr, you call on this witness to show what the saving to the Company would be, laying no foundation to indicate that this witness knows how much the Ohio Bell pays to the A. T. & T. for rendering that service, so that without making some allocation of what portion of the 4½ per cent is paid for that service I cannot see what the saving would be.

Mr. Burr: I will add to the question this element, that the $4,000,000.00 will be available to the Ohio Bell Company from the American Company at an interest rate not to exceed six per cent.

Mr. Kinnison: I object.

Commissioner Poor: I think the question is still objectionable. They pay the A. T. & T. six per cent for this loan. That still does not take into consideration how much of the 4½ per cent gross is paid in there for these services.

Mr. Burr: The ability of the Ohio Company to get money from the American Company at that low rate of interest is a part of the service performed by the American Company for the Ohio Company.

Commissioner Poor: That is true, and that is paid for. [fol. 8357] That is part of the 4½ that is paid in.

Mr. Burr: And to that extent it justifies the consideration.

Commissioner Poor: Supposing that he would go on the assumption that 1½ per cent of that 4½ per cent covers the payment for the services of doing this financing, and they pay them six per cent; that would cost the Ohio Bell then 7½ per cent for their money. Of course you cannot show what the savings would be until you would be first sure what it is actually costing the Ohio Bell for this, and what it would cost them if somebody else were doing it for them.

Q. What, in your judgment, is the value to The Ohio Bell Telephone Company resulting from its ability to borrow $4,000,000.00 from the American Company during the year 1924 on short notice, on its unsecured notes?

Mr. Dotson: I object.

Mr. Kinnison: They have already paid for that value.

Mr. Burr: At six per cent.

Commissioner Poor: The objection will be overruled.

Mr. Kinnison: Note an exception.

The Witness: As I understand it, the management company makes advances on very short notice, therefore making it unnecessary for the Ohio Company to pay interest on that money for a long period before the money itself is used. The ordinary practice would be for the utility company to provide this money well in advance of the time at which it is to be spent. Therefore interest would run against it and [fol. 8358] during the entire period. For instance, if a four million dollar program is in front of you for this year you would be under the necessity of providing all of that money now and paying interest charged on it during the entire year. If you take it in hundred thousand dollar lots and five hundred thousand dollar lots, as you will spend it, the interest charge to you is therefore very much reduced. This then would result, that instead of paying interest on $4,000,000.00 for 12 months, you would pay interest on possibly an average of $2,000,000.00 for 12 months, which would result in a saving of $120,000.00 a year. I have no doubt

that the actual cash saving would be something in excess of that. Some of your money would be spent in September, some in October and November, on which you paid interest for 1924 for only 30 or $60,000.00. That is a matter for accurate calculation, but would run, from my experience, somewhere in between 125 and $175,000.00.

Mr. Kinnison: We move that the answer be stricken out.

Q. That is for the total saving?

A. For the total saving for a period of one year.

Mr. Kinnison: Now, Your Honor, we move that the answer be stricken out for the reason that there is no fact supplied to the witness as to the terms of the loan and he has supplied it himself from the witness stand.

Commissioner Poor: The motion will be overruled.

Mr. Kinnison: Note an exception.

Mr. Shuler: Mr. Eaton, no well-managed utility would [fol. 8369] ever allow itself to get into a position where it would suddenly demand such a large sum of money, would it?

Mr. Burr: Suppose it can't help itself by reason of low rates?

Mr. Shuler: Let him answer the question.

The Witness: A well-managed utility would anticipate its requirement and would have the money in the bank who would be paying interest on it during the entire period.

Mr. Shuler: Can't you answer my question yes or no, Mr. Eaton? I did not ask you——

The Witness: Would you ask the question again?

Mr. Shuler (continuing): Anything except a question that can be answered categorically.

The Witness: Will you ask it again?

Mr. Shuler: Read it.

(Question read.)

Mr. Burr: Just a moment.

Mr. Shuler: Answer that yes or no.

Commissioner Poor: If the witness can answer it categorically yes or no, he may do that and then explain. And if he cannot answer it categorically let him say so.

Mr. Burr: Let me point out the unfairness of that question——

Mr. Shuler: Well, now, if——

Mr. Burr: Just a moment, please. I say the question is not fair.

Mr. Shuler: Mr. Chairman, I ask——

Commissioner Poor: Just one at a time, Gentlemen.

[fol. 8360] Mr. Shuler: Yes. If you please, this is the——

Commissioner Poor: Just one at a time. Mr. Burr is talking.

Mr. Burr: The question is absolutely unfair and cannot be answered categorically. The question is whether a well-managed utility would allow itself to get into a certain position. Now this Commission knows perfectly well that however well a utility may be managed, if its rates are rates fixed by a body such as this is, and even though its rates may not be fixed in that way, however well the utility may be managed it may be in position where it cannot finance itself at all, and the question of management has nothing to do with the ability of the company to finance itself. The two are totally separate.

Suppose the gas company here, managed as efficiently as a gas company can be managed——

Mr. Kinnison: He is going to tell him what to say.

Mr. Burr: Just a moment—managed just as efficiently as a company could be managed, at the same time that company might readily find itself in a position where it could not finance itself at all. And therefore I say the question is manifestly unfair, particularly when the gentleman on the other side insists upon the categorical answer. It is like the old question asked of the witness on the stand, "Do you still beat your wife", with the insistence upon the categorical answer to that question.

Mr. Shuler: If I had not such a high personal regard for Mr. Burr as a lawyer, if I did not know Mr. Eaton as I [fol. 8361] know him, I would speak entirely differently from what I intend to speak. Here is my point in all these interruptions by counsel for the Telephone Company, my point is Mr. Eaton is put on this witness stand as an expert utility man, qualified as such, considerable experience in the management of public utilities. He is further put on this witness stand as an expert on the sale of utility investments. I asked Mr. Eaton a question which comes within the line of one of those phases for which he stands qualified as an expert. The Commission orders the witness to answer it categorically yes or no, if he can, and Mr. Burr gives us a

harangue on why he cannot answer it, and he is not the witness of whom I have asked the question. If Mr. Eaton as a qualified utility manager and operator is unable to answer that question, well and good, but I do not ask it from Mr. Burr and we do not care for Mr. Burr's reasons why he cannot answer the question.

I am going to object from now on whenever Mr. Burr puts a witness on the stand whom he has qualified in the field in which the examination is being made, to tell why he cannot answer the question. Let the witness answe the question. If the question is an unfair one, as Mr. Bur says, let the man on the stand—we are all familiar with it as lawyers—if the witness cannot answer it, let him say yes or no, or "I cannot answer", or "The question is in such shape that I cannot answer it", or, as Mr. Burr has suggested, let the answer be categorical and let him make his qualifications.

[fol. 8362] Mr. Burr: Mr. Shuler, you forget that we are in the direct examination of this witness and that every question that you ask is an interruption, in the first instance, and it is only permitted because of our desire to be just as courteous as we can.

Mr. Shuler: We have not forgotten it, and I personally withdraw asking any more questions until cross-examination.

Mr. Burr: I did not ask you to do that, but I ask you to allow us, when you do put the question, to state our reasons why we believe the questions are improper.

Mr. Shuler: But not until the witness has refused to answer.

Commissioner Poor. Go ahead.

Mr. Burr: Read the question.

Mr. Shuler: I will withdraw the question until cross examination.

Mr. Burr: Very much obliged to you.

Q. If, when the time comes, Mr. Eaton, when The Ohio Bell Telephone Company will be able to do some permanent financing on its own behalf, what will you say as to whether or not any benefit will accrue to that company in the disposition of its securities by reason of the fact that there is this contractural relationship between it and the American Company?

Mr. Dotson: I object to that question.

Commissioner Poor: Objection sustained.

Mr. Burr: Let the record show that the witness, if per-
[fol. 8363] mitted to answer, would state that in his judgment there is a great, intangible benefit and would be under those conditions accruing to The Ohio Bell Telephone Company in the way of general stability of the American Company's financial condition and the fact that the American Company has the relationship which it has with the Ohio Bell Company.

Mr. Burr: Will you cross-examine at this time, Mr. Shuler?

Mr. Shuler: Have you finished?

Mr. Burr: Yes.

Mr. Shuler: Well, I have a few questions I would like to ask.

Cross-examination.

By Mr. Shuler:

Q. Mr. Eaton, you are familiar with public utility management and corporate inter-relationships, are you not?

A. I am familiar with public utility operation and management.

Q. Are you at all familiar with the inter-corporate relationships between The American Telephone & Telegraph Company and the Bell associated companies, what we call the Bell Associated Companies, seven companies existing in various states of the Union?

A. Yes, I have some knowledge of that condition, sir.

Q. You know that the A. T. & T. owns—now correct me if I am wrong—approximately 98 per cent of all the com-
[fol. 8364] mon stock of all of those companies?

Mr. Burr: I don't think that is quite correct.

Q. Let us limit it then to Ohio, and in Ohio they own approximately 98 per cent of all the common stock of The Ohio Bell Telephone Company; you are familiar with that?

A. Yes, sir.

Q. You are familiar with the fact, of course, that the Cities Service, the Pure Oil, the American Gas & Electric, the Pacific Gas & Electric, the Standard Oil of New Jersey, in the utility game are holding companies and own companies, subsidiary companies, scattered throughout the United States?

A. Yes, sir.

Q. You are familiar with the fact that the U. S. Steel Company is a holding company, owning common stocks of all its subsidiaries in various states in the Union?

A. Yes, sir.

Q. You are familiar with Standard Parts of Cleveland?

A. There isn't any such thing.

Q. No; you were?

A. Yes, sir.

Q. And Goodyear?

A. Yes, sir.

Q. Do you know of any public utility or industrial corporation, a holding company, owning practically all of the stock of its subsidiaries which makes a charge to those subsidiaries for financial assistance?

A. I know of many that do.

Q. You do?

A. Yes.

Q. Which ones?

A. All of the leading ones, insofar as I know of their——

[fol. 8365] Q. Name particularly one of them?

A. The Electric Bond & Share Company, The American Power & Light, The Cities Service Company, through the managers of their subsidiary, H. L. Doherty & Company.

Q. What are those charges?

A. They vary in all of those companies.

Q. Name me one case that you know of where a charge was made?

A. The American Power & Light, for instance.

Q. The American Power & Light?

A. Yes, sir.

Q. Where does it own companies?

A. It owns Duluth, it owns a group of properties on the Pacific Coast; they own some in Kansas; they own some in Texas.

Q. Now name a specific instance; name a specific instance where they made a charge?

A. They charge to all of those companies a percentage of their gross.

Q. What is that?

A. They charge to all of those companies a percentage of their gross income.

Q. I am satisfied with that answer. They charge them a percentage of their gross income. What is that percentage?

A. Five.

Q. Five per cent; all right; for what? Wait a minute. Can you obtain a copy of the contract under which that charge is made?

A. No.

Q. Are you familiar with that contract?

A. No.

Q. You are not?

A. No.

Q. You don't know what that contract comprehends?

A. Not fully, no.

Q. It is a particular charge for a particular thing, is it [fol. 8366] not? Well, he says he is not familiar with the contract. You are not familiar with the contract, I take it?

A. No, sir.

Q. Then what you are testifying to—how can you testify to it?

A. Well, that is based upon my general information and from what their officers have told me of their practice.

Q. It is hearsay testimony?

A. It is what officers and directors of those companies have told me their practice is.

Q. Do you know the percentage of stock holding in the subsidiary?

A. In the instance of the company I have mentioned, it is 100 per cent except for directors qualifying shares.

Q. And you have been told by officers that they pay five per cent on every loan they make?

A. No.

Q. What did I understand you to say?

A. I said that they charge five per cent for the services that they rendered to their subsidiary companies.

Q. For what, for financing?

A. No.

Q. What is that?

A. No, for the entire services which they perform.

Q. You have not then caught my question at all. Your answer is not to my question. My question was for financing, not for services rendered, because of course if your answer pertains to various services rendered or things furnished, we would not know what percentage, if any, was allocated to financing unless we had the contract.

[fol. 8367] A. May I have your question read again?

(Previous question read as follows: "Do you know of any public utility or industrial corporation, a holding company, owning practically all of the stock of its subsidiaries, which makes a charge to those subsidiaries for financial assistance?")

A. I am sorry I interpreted your question a good deal broader than you intended it. I assumed you were referring to the entire arrangement because your original question was, as I recall it, was I familiar with such relationships,——

Q. Was your answer to my question——

A. So that my answer is not correct, because the charges to which I refer have to do with the entire service rendered and not solely to that financial assistance.

Q. Your answer to my question, and confining your answer to my question, must be what? It must be "NO", mustn't it?

Mr. Burr: No, let us read the question again.

(Question read.)

Mr. Burr: Will you make the question a little broader or plainer in this respect——

Mr. Shuler: No; my reason, Mr. Commissioners, is this, they are putting this man on the stand to show the value of this financial assistance. Now my question is confined to a cross examination of the witness as to direct-examination, which is the only proper place for me to cross examine this witness. I could not cross examine this witness as to contracts existing between other holding companies, because [fol. 8368] the witness himself says he does not know of any; he has never seen, he does not know what those contracts contain. That would be the first objection. The second objection would be that the direct-examination has not brought out this witness as an expert on those other phases of any contract that may exist. So I must of necessity confine my question on cross-examination to the question on direct.

The Witness: Now may I answer the question?

Q. If you can?

A. I am informed by——

Q. No, what you know; not what you are informed. This is the same as a Court proceeding. You are only allowed to testify to what you know.

A. The testimony could go to the best of my knowledge and belief.

Mr. Burn: Yes, you are entitled to answer it that way.

Mr. Shuler: No, he is not at all now. I want this witness to be just fair and that is all.

Mr. Kinnison: He can say no if he don't know.

Mr. Shuler: I don't want him to even appear as a partial witness if he can avoid it.

Q. You have admitted you have never seen any of the contracts?

A. I have not.

Q. You have never seen any checks made from one to the other or receipts for payments for these things, have you?

A. No.

Q. Then how can you testify otherwise than that you don't know?

A. Well, I have, as I said——

Q. Of your own personal knowledge?

[fol. 8369] A. I have been informed by the officers and directors of these companies that they make such charge.

Q. Mr. Eaton, do you think you are fair in this matter in attempting to get into the record hearsay evidence when hearsay evidence is not competent evidence, and you know that it is not?

A. I do not think it improper for me to testify as to the contracts of other companies with which I am not associated.

Mr. Shuler: What does the Commission rule on his right to give hearsay evidence?

Commissioner Poor: He must answer according to his knowledge, and limit it to his knowledge.

Q. You have no personal knowledge on it, have you?

A. Only that supplied by officers and directors of these various companies.

Q. Now, Mr. Eaton, what should a public utility carry as liquid assets? Or let me state it this way, please. What would be liquid assets of a public utility?

A. Its cash on hand, its accounts receivable and its merchandise that it has for sale if it conducts a store.

Q. Now, listen, Mr. Eaton, you are here testifying on The Ohio Bell Telephone Company and I am asking you with reference to The Ohio Bell Telephone Company, of course.

What would be the liquid assets of The Ohio Bell Telephone Company?

A. Its cash and its accounts receivable.

Q. Now you are familiar with public utility corporations—that Commissions only allow them a certain sum for working capital, are you not; which means an amount of money [fol. 8370] required to conduct their ordinary business in the year; is that right?

A. That is something, of course, that varies very greatly from state to state.

Q. But the public utility never carries much cash assets?

A. Except in preparation for construction programs.

Q. Therefore most public utilities find themselves in a position where they do not deal with banks as a commercial manufacturer does, who gives the bank his trade acceptances for purposes of loans; isn't that correct?

A. A public utility cannot deal with a bank on that basis.

Q. So it is nothing astounding that The Cleveland Trust Company would not make a loan to the Bell Telephone Company on that statement you have, is it?

A. It would not be good banking practice for the Cleveland Trust Company to do it.

Q. To any public utility?

A. No, it would not be good banking practice.

Q. Now I have not a copy of your Bell statement, but I may have misunderstood you. I understood you to say that the amount available for interest was $3,800,000.00; is that correct?

A. That is roughly correct, yes.

Q. By that——

A. That is approximately correct.

Q. You made some statement of $1;400,000.00; what was that?

A. That was the annual interest on the company's present debt.

Q. That is right. And the present debt is 22 million, isn't it?

A. 22 million odd, yes.

[fol. 8371] Q. So after paying the interest on that 22 million they would have available for further interest payments $2,400,000 on that statement, would they not?

A. Two million four approximately, yes, sir.

Q. Then why did you testify that on that statement as it is the company could now only issue about two million

and a half more of bonds? Wait a minute; let me get the question finished; $2,400,000.00 of money available for interest would enable the company to sell how many dollars worth of bonds?

A. If you mean two million four available for interest——

Q. That is what you said. I am only taking your word.

A. Yes, but you have already deducted a million four interest.

Q. Let us get ourselves correct. You told me that this statement showed $3,800,000.00 available for interest?

A. Yes, sir.

Q. You told me that $1,400,000.00 would be required to pay the interest on present obligations?

A. Correct.

Q. That would leave $2,400,000.00 available for further interest obligations—interest on further obligations?

A. You may construe it that way and be correct, I think.

Q. All right; correct, am I?

A. Yes.

Q. Now with $2,400,000.00 of money available for further mortgage obligations, how much could the company sell additionally; how much mortgage bonds additional could it sell?

A. It is a requirement in a financing of this kind——

[fol. 8372] Q. I do not care for you to explain; just the amount?

A. You say two and a half million dollars?

Q. While $1,400,000.00 will pay the interest on 22 millions of dollars, then $2,400,000.00 would only justify the sale of $2,500,000.00 additional; in other words the whole obligation could be paid off in one year's interest, and you say that is all that is justified to be issued?

A. You of course are showing the amount left after you have already deducted a very large interest charge.

Q. Correct.

A. Which no investor or banker would permit you to do if you were selling him securities.

Q. Mr. Eaton, your answer is that they could only issue $2,500,000.00 additional?

Mr. Burr: No, he told you what his answer was.

Q. Is that your answer?

A. Yes.

Q. Then why did you answer Mr. Burr that the earnings of the company are sufficient to justify ten million dollars more of bonds?

Mr. Burr: He did not say that.

Mr. Shuler: I refer to the record.

Mr. Kinnison: That is the record.

The Witness: I stated that this statement would justify ten million dollars of a bond issue. I was assuming that he was making that a prior charge ahead of anything now existing.

Q. Now that question a minute again. What amount of mortgage bonds would that statement justify today, for-[fol. 8373] getting all present obligations?

A. That is, if there were no present obligations?

Q. Precisely so.

Mr. Kinnison: You mean bonded obligations?

Mr. Shuler: All kinds.

The Witness: It would justify a 25 million dollar bond issue.

Q. Now you stated a moment ago when you answered Mr. Burr 10 million; did you mean that that 10 million should be a first lien on the property?

A. Yes; his question was, would this company justify a 10 million dollar bond issue. My answer is yes.

Q. Will justify a 25 million dollar bond issue, will it not?

A. Yes.

Q. What do investment houses demand in bond issues, that the earnings should represent for bond issues? Do I make myself clear?

A. Yes, entirely. The normal requirement is two and a half times. The earnings must be two and a half times the bond issue. That is varied either way and effects very much the cost of the financing and the yield of the security to the investor.

Q. Now on $3,800,000.00 you contend that a mortgage bond issue to the extent of how much would be justified?

A. Not to exceed the extent that would use up—I will just calculate that to be exact, if you would like to have me do it. Your total bond interest should not exceed a million and a half dollars.

Q. A million and a half dollars?

[fol. 8374] A. Per annum. On that showing you would have two and a half times your interest charge.

Q. What would be the principal of the bond issue?

A. That would depend on the coupon rate on the bonds.

Q. They are selling at five now, aren't they?

Mr. Burr: Who are?

Mr. Shuler: The investment houses.

The Witness: No, I cannot accept that statement.

Q. How about Continental, what does it sell to yield?

A. It depends on the security it has. It has a five and it has a six and it has a seven.

Q. You are talking about good security and that is the only kind of stuff your house deals in, and that is what your testimony is in this case—based on a good sound utility?

A. Yes.

Q. On a five per cent basis how much could be sold?

A. No bonds of this character could be sold on a five per cent basis.

Q. This is not a good utility?

A. I know of no utility that is being sold on a five per cent basis.

Q. I thought I understood you to say that some were sold at five and five and a half?

A. No, no, I said it has bonds that have a five per cent coupon, but that is subject to discount.

Q. Take the Ohio Bell Company, what would its coupon charge be?

A. It would have to yield at least six per cent; 25 millions at that would just be a million and a half dollars.

[fol. 8375] Q. That is the way you figure it out?

A. Yes, sir.

Q. A million and a half and 25 million?

A. Yes, sir.

Q. Hasn't your house, within the past three months, put out utility collateral notes?

A. Yes.

Q. To yield——

A. Seven per cent.

Q. Which one was that?

A. Continental Gas & Electric Company.

Q. Now, Mr. Eaton, the corporation that owns a lot of subsidiaries is interested in keeping those subsidiaries in good financial condition, is it not?

A. Yes.

Q. It is really of prime importance that it should keep those subsidiaries in good condition?

A. Exceedingly important, yes.

Q. Because its earnings depend upon the utility being in a good condition?

A. Yes, its earnings are very directly affected by that.

Q. Therefore it is to the interest of the A. T. & T. to advance sums of money to these associated companies at all times that they require them? Is that not right? Is that correct?

A. I don't think I could say necessarily to its advantage. It might use its money elsewhere very much more advantageously insofar as yield is concerned.

Q. I did not ask you that question. I did not ask you how you would advise the company to invest its floating assets. Please confine the answers to the questions if you can answer them.

A. May I have that question?

(Question read.)

A. It is a little difficult for me to answer that question [fol. 8376] directly. It seems to me it is a question of the interest return it gets on this money.

Q. All right. Now, Mr. Eaton, what is the average return obtained by banks on their loans?

Mr. Burr: Are you referring to National banks?

Mr. Shuler: Well, I can only answer with reference to a bank.

The Witness: That varies in different parts of the country.

Q. I am talking about Ohio.

A. Take it by sections. I assume in this section of Ohio the average is probably over seven per cent.

Q. You think it is?

A. Yes.

Q. Do you know?

A. That is my judgment as to what it is.

Q. But you don't know, as a matter of fact, do you?

A. No, I don't know.

Q. Do you know the average rate of return made by the New York Life or the Mutual Life or the Prudential Life on their investments?

A. Those figures are not in my mind at the moment. I am a stockholder in the Union Central of Cincinnati.

Q. Which is one of the highest in the country by the way?

A. And our return there is 6½.

Q. Because you loan mostly in the west. That is one of the largest. That company has one of the largest returns of all insurance companies. The Northwestern used to have [fol. 8377] the largest until they lost——

Mr. Burr: Just a moment.

Mr. Shuler: Strike it all out.

Q. Do you know what the eastern companies make for theirs?

A. No, I cannot answer that.

Q. Do you know anything about the financial——

A. I have a general idea.

Q. A six per cent loan is a pretty good loan, isn't it, Mr. Eaton?

A. It depends entirely on the liquidity of it and the security behind it.

Q. But I mean if the security is fair six per cent is a good loan—a good return on the money?

A. No, not if the security is fair. If the security is excellent it is good.

Q. If the security is excellent that would be an excellent return, woudn't it?

A. No, that would be a normal return on an excellent bit of security.

Q. What is the next higher class beyond excellent?

A. Good; good, fair, poor, rotten.

Q. What would you call a municipal bond; how would you classify a municipal bond?

A. Excellent.

Q. Correct. How would you classify a real estate mortgage bond or loan?

A. They come in many categories.

Q. What would be a government bond?

A. That of course is the highest class of bonds.

Q. That would be Class Excellent A?

A. Yes.

Q. What I am trying to get at, Mr. Eaton, is this, The American Telephone & Telegraph Company has large sur- [fol. 8378] plus capital you say always carried; if they are able to invest that at six per cent and get six per cent for it, they have got a pretty good average return for their money, have they not?

A. It depends entirely on the money market. There are frequently times they can loan it on call at seven per cent.

Q. We are talking not about temporary fluctuations in the market, but over a long period of time?

A. The price of money varies just as rapidly and as constantly as the price of any other commodity.

Q. You have no trouble in selling The Ohio Bell Telephone Company preferred stock at 105, do you?

A. There is a fair demand for the stock, I would say, at that price.

Q. It is selling at 105 to what?

A. To 104.

Q. Recently sold at 105, did it not?

A. Yes.

Q. I think at 105½, but I am not certain.

A. I think it touched that one day.

Q. It is a seven per cent preferred stock, isn't it?

A. Yes, sir.

Q. How much is outstanding, do you know?

A. My memory is it is about $28,000,000.00—$28,215,- 000.00.

Q. $28,000,000.00 of stock you say, first preferred stock, is outstanding which is selling on the market at 105?

A. Yes.

Q. In your opinion then you could not issue any more than $2,500,000.00 of bonds on The Ohio Bell Telephone Company at the present time, notwithstanding there is $28,000,000.00 of preferred stock outstanding which is sell- [fol. 8379] ing on the market at 105?

A. You see——

Q. You can answer that yes or no, can't you?

Mr. Burr: Let him answer.

Mr. Shuler: He can answer yes or no and then take care of it.

Mr. Kinnison: The witness is perfectly capable of taking care of himself.

Mr. Shuler: If he cannot answer he may say so and then the deductions to be drawn from the answer are for the Commission.

The Witness: I say two and a half millions is the normal amount of bonds to be put out against that showing, considering, however, this company has a subsidiary of The American Telephone & Telegraph Company.

Q. You mean is, not as?

A. Is, I said; considering it is that. The investor has come to have so high a regard for that credit that he buys most anything that is sponsored by that company.

Q. Then this company is not a normal company, is it?

A. Its securities as reflected in the market——

Q. Are not normal?

A. Are not based on its record, and that same stock that is now 105 was 85 before it came under the wing of the American Company.

Q. When was that?

A. That was in '21.

Q. Don't you know that in '21—you say it was selling at 85?

A. The preferred stock of this company.

Q. Of what?

A. Of The Ohio State Telephone Company, that is.

[fol. 8380] Q. What was the Ohio Bell selling at; what was the Cleveland Telephone selling at?

Mr. Burr: There is no such thing.

Mr. Shuler: We are talking about '21. Wasn't there?

Mr. Cooper: No. The Cleveland Telephone Company——

Mr. Shuler: I am trying to get at '21; the Ohio Bell was not selling on the market in '21 at 85 for the preferred because there was no such company in 1921. You mean the Ohio State was selling at 85?

The Witness: Yes, sir, it was exchanged for this present stock.

Q. The point is this——

A. It would have been more correct to have said the predecessor stock of this company.

Q. Mr. Eaton, you said the reason that the first preferred

stock is selling at 105 is because it is associated with The American Telephone & Telegraph Company?

A. For no other reason in the world.

Q. And that is the reason I contend and am trying to get you to admit that they could therefore sell more than $2,500,000.00 worth of mortgage bonds on the property which would precede the $28,000,000.00 of preferred stock?

A. In a financial set-up bonds have to bear a certain proper relation to preferred stock and common stock, and it is a rule of all good companies and of good bankers to limit the bonds to an interest requirement that will not exceed two-fifths of the net earnings.

[fol. 8381] Q. Mr. Eaton, a preferred stock is secondary to a bond, isn't it?

A. Of course, and yields a very much higher rate of interest, and that is because it is secondary and because it is used to furnish junior money.

Q. Certainly, but you do not mean to say that the preferred stock which is limited to a certain return will get a certain value because of its association with another corporation where the bond buyer won't take the same chances as the preferred stockholder, od you, or take into consideration the same things?

A. The bondholder never takes the chances that the preferred stockholder does; he takes the lesser return; the preferred stockholder takes a greater risk and gets a much greater return and the common stockholder takes a still third risk and expects a very much larger return by reason of the position which he occupies.

And thereupon a recess was had until 1:30 o'clock P. M. of same day (Friday, February 29th, 1924.)

[fol. 8382] Friday Afternoon Session

February 29th, 1924.

And also C. S. Eaton, resuming the stand for further cross-examination, continued his testimony as follows:

Cross-examined by Mr. Shuler:

Mr. Burr: In order to keep the record straight we will offer in evidence the Annual Statement of The Ohio Bell Telephone Company to its stockholders for the year 1923,

being the report containing the statements to which the -tness Mr. Eaton has been referring from time to time, and I assume that counsel will accept my word for the fact that this is a true and correct copy of the report without my calling Mr. Cooper or someone else to identify it?

Mr. Shuler: Sure.

Mr. Burr: Otherwise we will make proof in the ordinary way.

Mr. Shuler: May I just have a piece of information? This telephone operating revenues, $24,685,133.74, is the total operating revenues after deducting the 4½ per cent payment to the A. T. T.; that is correct, isn't it?

Mr. Cooper: Yes, that is right.

Mr. Shuler: So that it is only 95.5 per cent of the total revenues. Can you give us the exact amoung of that payment? I figured it up $1,081,000.00; is that approximately correct?

[fol. 8383] Mr. Cooper: Yes, that is approximately correct.

Mr. Shuler: Then the 4½ per cent payment in 1923 was $1,081,000.00 approximately?

Mr. Cooper: Somewhere around there. I don't recall exactly.

The Witness: With the Commission's permission, I would like to say that in my early cross-examination when I referred to percentage charged by holding companies to subsidiaries I was not including in there any charge for money actually loaned. When I referred to a five per cent charge as being a normal one, that did not include any charge made for moneys actually loaned to subsidiaries.

Mr. Burr: By the parent organization?

The Witness: By the parent organization.

Mr. Burr: Well, is there such a charge?

The Witness: Always such a charge.

Mr. Burr: Interest charge?

The Witness: Always an interest charge for money actually loaned.

Mr. Burr: If it were not for the contract between The American Telephone & Telegraph Company and The Ohio Bell Company, to which we have been referring from time to time, at what price would the preferred stock of The Ohio Bell Telephone Company be selling, in your judgment?

Mr. Shuler: Oh, we object.

Commissioner Maullar: You are asking this witness for his opinion?

Mr. Burr: Yes, that is all.

[fol. 8384] Commissioner Maullar: You may answer. The objection will be overruled.

Mr. Shuler: May we cross-examine him a moment to see whether he knows anything about the contract? I don't believe Mr. Eaton has ever read the contract.

The Witness: Yes.

By Mr. Shuler:

Q. When did you read it?

A. Today—last night.

Q. Today?

Mr. Burr: And last night, he said.

Q. And last night? What does that contract provide as to services furnished that gives this element of value to the preferred stock?

A. That contract provides that the parent company will lend its assistance in all of the financing operations of its subsidiaries.

Q. And it is that paragraph then to which you refer when you are going to give your opinion as to the effect of this contract on the preferred stock; is that right?

A. Yes, the fact that the finances of this company are directed and supervised by so sound an organization as the American Company greatly enhances the value of that stock in the mind of the investor.

Q. Now you would so state to an investor in purchasing that stock from you, that this contract gives it an additional value to him and adds greatly to the security of the preferred stock; is that right?

A. Yes, sir.

Q. That is right?

A. Correct.

Q. Do you know how long that contract lasts and when [fol. 8385] it may be terminated and whether it may be terminated at will? Do you know that, I ask you?

A. I know, as a matter of experience——

Q. No, no.

Mr. Burr: Let him answer.

Mr. Shuler: I am asking him if he knows where the provision of that contract is that makes it for any length of time.

Q. Let me ask you this, does that contract continue in existence for any length of time? Now you have read it and you are giving us an opinion based upon your accurate and full comprehension of that contract. Now answer my question.

A. I know from my experience in such matters that these contracts are continuously in force between the parent company and its subsidiaries.

Q. What do you know of this one? Is it going to be in force another year from now?

A. I don't recall the date stipulated.

Q. You don't know a thing about that, do you, and yet you tell us you would tell an investor today that he was safe in buying this preferred stock because of a contract that exists between the Ohio Bell Company and The A. T. & T. Company?

A. I would tell him that his investment was very greatly protected by the fact that it has behind it so experiences and solid an institution as The American Telephone & Telegraph Company.

Q. Would you add to that statement that "These statements are not guaranteed, but we have them on good in-
[fol. 8386] formation"?

A. No.

Q. You would not guarantee the statement, would you?

A. I certainly would assure him that he had a very substantial thing upon which to rely in that association. I would not guarantee that.

Mr. Burr: When you spoke this morning of a possible issue of $25,000,000.00 of bonds by The Ohio Bell Telephone Company, what consideration, if any, did you give to the fact that there was already certain outstanding underlying bonds upon the properties now comprising the Ohio Bell Company, or at least upon a part of the properties comprising that company?

The Witness: I spoke of 25 millions as being the maximum possible issue upon the present earnings. I mean that there is already approximately 22½ millions of outstanding debt and that the issue would be increased by approximately 2½ millions.

Mr. Burr: That is all.

By Mr. Shuler:

Q. Are all of your investments sold on earnings statements?

A. With the exception of municipal bonds they are all sold upon earning statements.

Q. You don't care a particle about the value of the property behind it?

A. Yes, we consider that very material, considering, however, that physical properties have very little aside from an earning power.

Q. You learned that in the Standard Parts case particularly, didn't you?

A. That was very beautifully illustrated in that com- [fol. 8387] pany. That had 25 millions of physical assets that realized perhaps seven or eight on liquidation because they did not have an earning power.

Q. Mr. Eaton, as you said this morning, if $4,000,000.00 were borrowed to be used during the year it would be unfair for the parent company to charge interest on the four million beginning today, would it not?

A. It would not be unfair. It would be the normal practice. However, it appears it is not done that way by the American Tel. & Tel. with its subsidiaries.

Q. Do you know what the A. T. & T. borrows money at? It can borrow money at a very low rate of interest, can it not?

A. It has very excellent credit. However, for a good deal of this money it pays 9 per cent to the stockholders.

Q. I beg your pardon?

A. For considerable of its money I know it pays about nine per cent.

Q. Can you give me one instance where it pays nine per cent on the money that it borrows?

A. On the money that it owes to its stockholders.

Q. Let us be fair now and reasonable. I asked you for money that it borrows and you are telling me what it pays its stockholders, nine per cent per annum. That nine per cent is dividends?

A. I understood your original question to be what it pays for money, not borrowed money.

Q. When one talks about that to investment houses what do investment houses understand one to mean?

A. The company pays several rates for money that is

secured by first mortgages on its assets. It pays a some-
[fol. 8388] what higher rate for money that is next, junior money, and money that represents a preferred position, such as preferred stock.

Q. Now just a moment. You know perfectly well as an investment man that no company does or can agree at all events to pay any rate on preferred stock, do you not? It can only pay a dividend out of earnings; is that correct?

A. Only out of earnings.

Q. Certainly.

A. But it does agree to pay a certain fixed rate out of earnings if those earnings develop.

Mr. Burr: Correct.

Mr. Shuler: Certainly.

The Witness: Then it must pay to the people who take the low position with the company, namely those who furnish the real junior money by way of common stock—it is compelled to pay to those people who take a great risk a very much larger return, and it is money of that sort that has made possible the great enterprises of this country. Cleveland is a great city today because our people have been willing to put their money into common stocks of our great corporations.

Q. I don't care for that unless you want me to bring out some particular instances where you have sold some preferred stocks, which are practically bonds, and get nothing on them, such as Goodyear and Standard Parts.

A. Our firm did not sell any Goodyear preferred or Standard Parts preferred.

Mr. Burr: I don't think that is fair.

[fol. 8389] Mr. Shuler: I don't either. I was only cutting off his thesis.

The Witness: I was saying that in defense of our people in Cleveland, that in spite of unfortunate losses in instances of that kind they have not hoarded their money and put it into first mortgage bonds only. They are still willing to take a risk for the benefit of the community.

Q. But to go back to my only question that I have before you, Mr. Eaton, do you know what rate of interest the A. T. & T. pays for its money; so that we may have no misunderstanding about it, in view of the fact that I am only

a layman, I will say what rate of interest does it pay for its borrowed money?

A. Well, I am not competent to answer that question fully.

Q. You don't know that they pay 4½ per cent?

A. I am not advised as to what they pay.

Mr. Burr: You do not make that as a statement of fact, do you?

Mr. Shuler: I asked him if he knew.

Mr. Burr: You did not ask him if he knew whether they did. You asked him if he know that the American Company did that.

Mr. Shuler: I do not intend it to be considered as evidence.

Mr. Burr: All right.

Mr. Shuler: That is all so far as I am concerned.

Mr. Burr: Have the Commission any questions to ask Mr. Eaton?

[fol. 8390] Commissioner Maullar: I haven't any.

Mr. Burr: That is all, Mr. Eaton. Thank you.

Mr. Shuler: It is understood Mr. Eaton is excused subject to call?

Mr. Burr: You are willing to return for further cross-examination?

The Witness: You mean today?

Mr. Shuler: Oh, no, not today.

Mr. Burr: At some subsequent time?

The Witness: Yes, sir.

[fol. 8391] And also A. B. CRUNDEN recalled as a witness, having been heretofore duly sworn, continued his testimony in chief, as follows:

Examined by Mr. Burr:

Q. Mr. Crunden, at the close of your testimony yesterday I believe that there had been offered in evidence——

A. We were about to offer in evidence certain exhibits, Mr. Burr.

Q. I think there had been offered in evidence——

A. But not numbered.

Q. No. 11.

A. I will take that back.

Q. Numbers 11, 12, 13, 14 and 15 had already been offered. We were referring to some charts in which you have applied a straight line principle to an assumed taxicab business in a simple way.

A. Yes, sir, and Mr. Williams was engaged in preparing these exhibits to be marked for identification.

Mr. Shuler: This is simply a type to explain the system?

Mr. Burr: Yes.

Mr. Shuler: Mr. Crunden, what is your average straight line based on, 10 years, 15 years or 20 years?

The Witness: In these exhibits?

Mr. Shuler: No, no, in the Bell?

The Witness: On the life of the telephone plant? Well, that varies in different areas in accordance with the pro-

[fol. 8392] portion of long and short life plant.

Mr. Shuler: I mean all over.

The Witness: There is no such thing.

Mr. Shuler: What would it be in Ohio?

The Witness: I would not be *albe* to say without definite examination of the figures. In any event it is an engineering question and really should be addressed to an engineer.

Mr. Burr: The Chart marked Crunden Exhibit 16, and which is headed "Example to illustrate Depreciation Accounting during periods when property in service is (1) growing, (2) stationary; and (3) declining", is offered in evidence.

The Chart marked Crunden Exhibit No. 17, and entitled "Net investment reserve for accrued depreciation", is also offered in evidence.

We next offer the Chart marked Crunden Exhibit 18 entitled "Annual realized depreciation, annual expense of depreciation."

And next is No. 19, the Chart marked Crunden Exhibit 19, entitled "Ration of annual realized depreciation to investment and ration of annual expense of depreciation to investment".

The last of this series is marked Crunden Exhibit No. 20, and is entitled "Record of cars in service by years and serial numbers". That also is offered in evidence.

And thereupon the Paper Writings last above referred

[fol. 8393] to were marked for purposes of identification and were offered and admitted in evidence on behalf of

The Ohio Bell Telephone Company and are herewith submitted, marked Crunden Exhibits Nos. 16, 17, 18, 19 and 20, and made parts hereof.

Mr. Shuler: I do not understand that second column. Do you mean to say, Mr. Crunden, that in the taxicab business one car will last for 24 years?

The Witness: No, sir. I will explain this exhibit, if the reporter is ready. Exhibit No. 16 gives an illustration of a taxicab business in which a man is assumed to enter the business starting with one car in the first year. During the first ten years the business grows steadily, requiring the addition of one car in each year. During the next subsequent six years the business remains stationary; that is, it requires ten cars in service during each of such six years. During the succeeding years down to the 25th year the business declines, requiring one less car each year until in the 24th year only one car is needed. The man is then assumed to retire from business at the end of the 24th year, all of the cars having been used up in service. It is assumed that the cars cost $1,000.00 each and that they have a service life of five years, and that for convenience there is no salvage. The columns of the chart are suitable headed so that I think the whole statement is self-explanatory.

It shows in the first column the years involved, and in [fol. 8394] the second column the number of cars in service each year. It then shows the serial numbers of the cars added, and in the third column the serial number of cars retired.

It also shows in column 4 serial number of cars added for replacement. Those cars are identified for the purpose of comparison with Exhibit 20, to which I will refer later.

In column 5 it shows the net investment in the cars at the beginning of the period. The investment starts with $1,000.00, reaches as high as $10,000.00 and finally declines to $1,000.00, and then to zero.

Column 7 shows the accumulated gross additions during the entire period amounting to $30,000.00 for both original and replacing cars.

Then there are some columns devoted to the depreciation account. First it shows the reserve for accrued depreciation at the beginning of the year; then the annual expense

of depreciation; that is the amount charged to expense and credit to reserve at the rate of 20 per cent per annum based on a five year life and 100 per cent depreciable cost.

In column 9 it shows what I term the annual realized depreciation. That is to say, the charges made to the reserve account, when the property loss culminates upon the retirement from service of the several cars.

Column 10 shows the reserve for accrued depreciation at the end of the year.

The remaining columns show some ratios. In Column 11 it shows the annual expense of depreciation which you will [fol. 8395] note remains 20 per cent throughout the period under review.

Column 12 shows the per cent of realized depreciation to the property of the same year, and the percentages in this column vary very widely.

Column 13 shows the per cent that the reserve is at the beginning of the year of the property existing at the same date that is taken for the calculation for the reserve. The reserve starts at zero and winds up at 100 per cent. The bearing of the several columns of that chart is made more clear by reference to the subsequent chart.

Mr. Shuler: May I ask a question for information?

Mr. Burr: Yes, be glad to have you to.

Mr. Shuler: Mr. Crunden, taking the telephone business, which does not go out of existence, why do you choose the taxicab business which does go out of existence? Because you can more clearly demonstrate your system?

The Witness: Yes, sir, and because the depreciable telephone property does go out of business. That is to say, years ago we had certain kinds of plant for which reserve accounts were raised, and those particular kinds have gone out of service and the reserve in respect to that has been used up. At the present time we have other kinds of plant for which we now have a reserve. Such plant in time will disappear and the reserve will disappear and no doubt the property of the telephone company will continue to be depreciable in a large measure and new reserve will appear and in time disappear, so that the layman's view—perhaps not your view, Mr. Shuler, but the average layman's view—[fol. 8396] that a reserve for depreciation remains the same, remains in a state of poise, a constant account which remains without change, is from the accounting point of

view incorrect. The accountant conceives of the reserve as in a continual state of flux. The amounts that are there are speedily gone and other amounts take their place. It is just as if there was a trough of water at which a horse was drinking. Water is trickling into the trough on one end and it is passing away through the horse on the other end. It might be conceived that the water in the trough remains stationary. In one sense there is a trough of water there continually, but in the true sense there is a continual change in that water in the trough.

Passing now to Exhibit 17——

Mr. Miller: Before we pass to Exhibit 17, Mr. Crunden; Column 8 represents the amount set aside for depreciation each year?

The Witness: Yes, sir.

Mr. Miller: Now each year when that money is set aside, whether it is retained in money or invested in property, it earns, does it not; it should earn?

The Witness: It should if the owner of that amount is a live person.

Mr. Miller: So that at the end of 25 years you not only have your $30,000.00 but you have what has been earned on that money, whether it is in the form of money or property; is that right?

The Witness: Yes, sir, certainly you would; but there is [fol. 8397] no question of earnings. This is the question of the mechanics of the reserve depreciation account.

In Exhibit 17 is shown graphically the net investment in the cars and a line is imposed upon the columns representing the net investment, which shows the growth and diminution of reserve for accrued depreciation. While the property is growing the reserve account is growing. While the property is stationary the reserve account is stationary. And as the investment disappears the reserve disappears.

Complementary to that is Exhibit No. 18. Exhibit No. 18 shows the annual expense of depreciation in dollars and the annual realized depreciation. The annual realized depreciation is shown by columns, and the true annual expense of depreciation by a ball and chain effect.

Exhibit No. 17 shows the balance sheet aspect of the problem, and Exhibit No. 18 the income statement aspect.

You will notice that the curve of the annual expense of

depreciation follows precisely the curve of the net investment shown on the other exhibit, whereas the annual realized depreciation does not so conform. There is no annual realized depreciation at all during the first four years. Commencing in the fifth year there is such depreciation, equivalent annually to the value of one car. Commencing with the tenth year the annual depreciation increases to $2,000.00, equal to two cars, and that continues until the 19th year inclusive. That is to say, it continues for some years after the investment has started to decline. You [fol. 8398] will notice that in the 24th year there is a charge for annual realized depreciation of one car, that being the last car of the entire series.

Now that exhibit shows that without the avoidance of any of the necessary expense of depreciation there is, in the showing made by the annual realized depreciation as compared with the annual expense of depreciation, a displacement, so to speak; that is to say, if dep-eciation were charged in accounts on the basis of the annual realized depreciation, it would be charged too late.

The expense properly charged, which would be charged as the annual expense of depreciation, is shown by the ball and chain line on this exhibit. There are certain shortages, so to speak, created by the treatment of annual realized depreciation which make the amounts, as compared with the annual expense of depreciation, small during the period that the property is increasing in size. When the property becomes temporarily static the amount of the annual expense of depreciation and the annual realized depreciation become equal. When the property commences to decline in amount, the amounts which were created as shortages in the early years appear as overages in the later years.

That is to say, if the books were kept on the basis of annual realized depreciation, the charges for depreciation in such later years would be heavier than they should be and very burdensome.

Exhibit No. 19 shows the true annual expense of depreciation, consisting of a dotted line, expressed as a percentage [fol. 8399] of the plant in service. You will notice that it is very consistent. It remains fixed on the 20 per cent line throughout the whole term.

The annual realized depreciation is expressed as a percentage of the property during the several years, and the progress of this percentage curve is extremely erratic. It

is zero for four years, jumps with abruptness to 20 per cent, then fluctuates through a wide range through the twentieth year, and then runs rapidly up to 100 per cent in the last year. The 100 per cent of the last year is of course due to the fact that there is only one car in service the last year, and that car goes out of service that year, and you divide a thousand dollars into a thousand dollars, giving you 100 per cent.

Exhibit No. 20 is helpful, I think, to some extent in making clear what is going on. It shows you several cars, the original and replacing cars, expressed by black blocks, and the blocks are numbered to conform to the numbering scheme shown on Column 2, 3, and 4 of Exhibit No. 16.

Wherever there is a break in the column it shows that at that point there is realized depreciation on a car at that moment going out of service, and the thought of the exhibit is this, that if you follow down from north to south, so to speak, on that chart, at any point where you see a break in the manner I have described, you will see that the realized depreciation represented by the cars that go out of service does not represent the proper charge for depreciation, because there are other cars which remain in service at that [fol. 8400] same time and for which no break appears.

For example, take the eleventh year. In that year Car 1-b goes out of service, and if you keep your books on the basis of annual realized depreciation a charge for that car would be placed in that year. But car 2-b does not go out of service in that year. It remains in use, and yet it is being used by the taxicab man in his business and it is depreciating.

Similarly, Car 3-b and Car 4-b etc.

Now the condition to which I am referring is dangerous, the misunderstand- which I refer to here, which is in the minds of a good many people, is dangerous, particularly when the plant is increasing in size or decreasing in size. At such times the amount of the annual realized depreciation is no criterion whatever to the true annual expense of depreciation.

I have another exhibit which will make the last mentioned point I think very clearly indeed.

Mr. Burr: The chart on the Exhibit may be marked Crunden Exhibit No. 21, and is offered in evidence.

Thereupon the chart above referred to is marked for pur-

poses of identification and is offered and admitted in evidence on behalf of the Ohio Bell Telephone Company and is herewith submitted, marked Crunden Exhibit No. 21 and made a part hereof.

Mr. Shuler: Does this still refer to the taxicab business? [fol. 8401] The Witness: No, this does not. I will explain this in a minute, Mr. Shuler. It would apply to the taxicab business but this particular illustration does not tie up with it.

Mr. Shuler: I thought not, because it is a difference in percentages.

The Witness: Yes, sir. The present Exhibit No. 21 is entitled "The effect of plant growth on annual realized depreciation, 5 per cent, 10 per cent, 20 per cent annual rates of growth."

You will recall that when we were talking about Exhibit No. 13, Table B, which gave an analysis of entries passing through the depreciation reserve account, that I brought out the fact that the reserve was small where there was a very considerable proportion of new plant. When the group of units about which we were then talking was in the situation of being quite new, the reserve was small. It gradually built up as the plant grew older until the point was reached where so many of the items began to pass out of service that the charges therefor caused the reserve account to diminish, and from then on it diminished steadily to zero.

Now Exhibit No. 21 is interesting in that connection. It shows annual expense of depreciation at the rate of six per cent on the investment. That is, of course, an assumption. That does not apply to any particular plant, or the Ohio Bell plant. That is not the intention. All that is, is [fol. 8402] illustrative merely.

Q. Now let us assume that the plant is growing at the rate of five per cent per year. Then as to the plant that was placed in service last year you will have no realized depreciation because the plant is new. All the realized depreciation that you are likely to have in that year will be in respect of plant that is older than one year. Still that plant will be depreciating so that it will be reflected in the six per cent line representing the annual expense of depreciation, but will not be represented in the line which shows the annual realized depreciation expressed as a percentage of the plant of the same year. The result of that

is that the annual depreciation when a plant grows five per cent a year falls at a line lower than six per cent. As a matter of fact it falls somewhere a little over 4½ per cent. Now when the plant grows ten per cent a year that condition is accentuated, and without explaining it more fully I will simply draw attention to the fact that it drops down now to the neighborhood of 3¾ per cent.

Mr. Shuler: Can you in a few words explain why that is?

The Witness: It is because you have something in your divisor for which you have no complementary result in your dividend. That is to say, you are dividing old plant upon which realized depreciation—you are dividing old plant constituting a group for the depreciation of a portion of which there is realized depreciation during the period [fol. 8403] under consideration—no, I have got mixed up on that long, involved sentence. Suppose I start again. It is hard to state a thing like this. That is why I brought the charts along because I think they do it better than I can.

Let us conceive that the telephone plant is placed on two sides of the street; and the older plant is on one side of the street and that the plant built yesterday and day before yesterday and of very recent date, is on the other side. On this side, which represents the older property, property is daily coming out of service, and its useful life has expired. Then you will have here what I call realized depreciation. Now if you divide the original cost of that property which is involved in the realized depreciation into the amount of the loss constituting the realized depreciation you will get a true depreciation percentage. But if you use as your divisor all of the plant in that telephone company, regardless of what side of the street it is on, you are going to reduce your percentage, are you not?

Mr. Shuler: Sure I get it now.

The Witness: That is what this thing is intended to bring out. It is sometimes said that annual realized depreciation is a function of the rate of growth. That is a very loose statement that would not be mathematically sound. There is no such true function.

Mr. Shuler: It is just simply because the business is larger that it is less?

The Witness: It is because it is growing. It is tem-

[fol. 8404] porarily less because you are getting today the realized depreciation on the plant of years ago.

Mr. Shuler: Would this be a fair illustration, Mr. Crunden; assume that the realized depreciation on the old plant is six per cent and the realized depreciation on the new plant is three; six and three are nine, and a half of that is four and a half?

The Witness: In this illustration here we are assuming that the true rate of depreciation remains stationary. These are simply units of plant.

Mr. Shuler: I am talking about the realized depreciation.

The Witness: Then I di- not understand your question entirely, Mr. Shuler. Will you repeat it?

Mr. Shuler: Suppose that the realized depreciation of the old plant is for a certain year six per cent and the realized depreciation of the new plant for that particular year is three per cent; then the realized depreciation on the whole plant would be one-half of six and three, or the one-half of nine, which is four and a half. Is that the reason why the second line is lower?

The Witness: If I understand your question clearly that is the reason. Let us assume that the true annual per cent of depreciation is six. Now because some certain property is older you are getting the full effect of its depreciation. Because other property is new there are only some of the very short life members that have come out of service, if any, and therefore as to those you get temporarily only a [fol. 8405] portion of the depreciation you are going to get. And I think your way of putting it is perhaps a very good way to understand it.

Mr. Miller: Mr. Crunden, these lines of annual realized depreciation would rise with a less percentage of extension or addition of new plant, wouldn't they?

The Witness: Yes, sir.

Mr. Shuler: That is the way I understand it, and I think I have it clearly in mind, and the more of new plant that is put in the more they would drop down?

The Witness: Temporarily.

Mr. Shuler: Yes, certainly; I think I understand it.

The Witness: Yes, sir.

Mr. Snook: Mr. Burr, might I ask a question?

Mr. Burr: Yes, Mr. Snook.

Mr. Snook: Mr. Crunden, referring to that Crunden Exhibit 17, I wonder if we could tie those together a little bit.

It seems, according to the diagram, that when the investment becomes static, that is, as much goes in as comes out, the reserve for accrued depreciation also stays static. That is, it stays at the same amount, according to this diagram, in rather a definite ratio.

The Witness: It does providing, of course, the depreciation characteristics of the plant remain unchanged.

Mr. Snook: As I get it, this condition is illustrated by the line at the top, providing six per cent is the correct depreciation. Now, referring to Exhibit 21, take from 10 to [fol. 8406] 16 on Crunden Exhibit 17 is illustrated by the top line of Chart 21, is it not?

The Witness: Yes, the theory on which those lines, headed or called "Annual expense of depreciation, are based is the same in all the exhibits. That is your point, as I understand it?

Mr. Snook: No, I mean as a matter of illustration, provided these charts are based on the same figures and same conditions, then that portion of the chart Crunden Exhibit 17, which would lie between 10 and 15 years inclusive, would be shown by the depreciation rate of six per cent, or the top line on Crunden Exhibit 21?

The Witness: As I understand you, yes, sir.

Mr. Snook: And the other figures would vary according to conditions?

The Witness: According to the rates of growth.

By Mr. Burr:

Q. Reviewing something I asked you yesterday, let me ask you, Mr. Crunden, whether the Ohio Bell Telephone Company, through the General Staff, is accorded or is given the benefit of the results of the investigations illustrated in these charts and by your answers to the previous questions?

A. Yes, we act as consultants of the associated companies on all of these accounting and mathematical questions.

Q. Has the American Telephone & Telegraph Company furnished in the past few years financial assistance to The Ohio Bell Telephone Company?

A. Yes, sir.

Question objected to by Mr. Shuler.

[fol. 8407] Q. Will you please describe what that assistance is?

Mr. Shuler: I object.

Commissioner Maullar: Well, if this witness knows, it is proper.

Mr. Shuler: That is the point. I would like to know how this witness knows about the finances. I am very much interested, if he knows enough.

Commissioner Poor: The question in form is not good. Objection sustained.

Q. I will put the question this way. Do you know to what extent The American Telephone & Telegraph Company has furnished financial assistance to The Ohio Bell Telephone Company in the organization of the latter company?

A. What do you mean by the organization of it? Does that go away back to the beginning of things—this new corporation here now?

Q. No, I was only going to consider The Ohio Bell Telephone Company from its organization by reason of the consolidation of the former Ohio Bell Telephone Company and the Ohio State Company?

A. When was that?

Q. That was September, 1921, and I only use that date so as to give you some guidepost for your answer.

A. Yes. I am familiar with that in a general way because I see vouchers passing through the office, and correspondence from time to time, and hear people talking about it, and in order that I could give some intelligent information on it I obtained from the books of the American [fol. 8408] Company these certain figures of the actual amounts that we have advanced to the Ohio Bell Company during the last three years.

Q. You may state what they are?

A. May I answer your original question there? Is there a question pending?

Q. Yes, if you want to add anything to that before testifying as to the actual amounts?

A. I thought I might read that paragraph of the License Contract which tells what the assistance is of which the Ohio Bell can avail itself.

Mr. Shuler: Doesn't that speak for itself?

The Witness: So that we can get at this point we are talking about.

Mr. Burr: The contract is in evidence, but you are permitted to read — into the record — you want.

The Witness: I do not want to waste any time, but this shows what we are talking about and is one of the matters of service furnished:

"Advice and assistance in any financing required to be done by the licensee in the extension, development or improvement of its telephone system within its said territory and in the general matter of its finances; aid in securing funds on fair terms as and when needed for new construction and other expenditures, but at no time to a greater extent than the then finances and credit of the licensee may permit; active assistance in the marketing of the licensee's securities; and such other necessary financial support and assistance in the premises as will tend to serve the best interests of both companies."

[fol. 8409] Answering your other question, the principal assistance that the American Company has furnished during the past three years has been to itself loan the Ohio Bell Company the money which it needed. The Ohio Bell Company would——

Mr. Shuler: I object to that statement. What does this gentleman know about how much money the Ohio Bell Company needed?

Mr. Burr: He is perfectly competent to answer that.

Commissioner Maullar: If he knows what the transactions are between the parent company and the Ohio Bell.

The Witness: I assume there, Mr. Shuler, that nobody would ask for money which they did not need.

Mr. Shuler: But they may have needed more and the A. T. & T. would not give it to them. That is the point.

The Witness: From my general knowledge of the size of the construction program of the Ohio Bell Company I would say that the money that they did receive was sufficient to carry out their program. You see the whole thing is interrelated, the size of the program, the number of employes, the burden on the supervisory staff, the amount of materials and supplies that can be purchased from various manufacturers and the amount of plant required by subscribers, and the amount of money which can be obtained

in the market for the development of utilities. It is one grand problem.

The amount which was advanced by The American Telephone & Telegraph Company to The Ohio Bell Company during 1921 was $3,661,000.00. During the year the Ohio Bell repaid $266,000.00 of that amount.

[fol. 8410] Mr. Shuler: What is that?

The Witness: $266,000.00.

In the year 1922 the A. T. & T. advanced $5,050,000.00, of which the Ohio Bell repaid $1,700,000.00.

And in the year 1923 the A. T. & T. Company advanced $4,600,000.00, of which the Ohio Bell repaid $2,864,000.00.

Q. Making the net indebtedness what?

A. I haven't the exact figure at the end of December, 1923, but I believe you gave it in round numbers this morning somewhere in the neighborhood of 11 or 12 million dollars.

Mr. Shuler: This would show, wouldn't it?

The Witness: No, because there is an old indebtedness carried forward from the time of the Cleveland Telephone Company of some nine million dollars.

Mr. Burr: It shows in Company Exhibit No. 2.

The Witness: I was just stating the annual transactions for those years.

Mr. Shuler: That is the reason I objected to the question and the answer—your answer is misleading.

The Witness: It is a technical objection, yes.

Mr. Burr: That report by the way may be marked Company Exhibit No. 2, and we reoffer it in evidence, although it has been offered before.

And thereupon the Paper Writing above referred to was marked for purposes of identification, and the same was offered and admitted in evidence on behalf of The Ohio Bell Telephone Company and is herewith submitted, marked [fol. 8411] Company Exhibit No. 2 and made a part hereof.

Mr. Shuler: You have no more of them?

Mr. Burr: No, but we will be very glad to supply you one, Mr. Shuler. It has been rather difficult to anticipate the copies that would be required of all of these exhibits and although we have already used up one or two trunks full——

Mr. Shuler: I will testify to five.

Mr. Snook: I was not here when Company Exhibit No. 2 was introduced.

Mr. Burr: That is the report.

The Witness: Upon Page 10 there is a statement of the balance sheet, which shows, under the heading of "Debt", the item "Advances from System corporations, $11,415,-607.94." I know of my own knowledge that that closely approximates the amount of the indebtedness, but I cannot say that that is the amount at this moment.

Mr. Snook: To what indebtedness are you referring?

The Witness: The advances which the A. T. & T. Company has made to The Ohio Bell Telephone Company up to December 31st.

Mr. Shuler: As I get it, that is supposed to be the net indebtedness at that time?

Mr. Burr: He does not say it is supposed to be. He says he knows it is approximately that amount.

Mr. Shuler: Put it that way. I don't care.

The Witness: The amounts in question have been loaned [fol. 8412] temporarily by the A. T. & T. Company at the rate of six per cent per annum, less two per cent for monthly payments. That is 5.88 per cent. And when I said that The Ohio Bell Telephone Company——

Mr. Shuler: How do you get 5.88?

The Witness: I mean that the accountant of The Ohio Bell Company takes——

Mr. Shuler: Two per cent of six per cent?

Mr. Burr: And that is .12 of one per cent?

The Witness: The Ohio Bell Company takes that discount if they prefer to pay the amount monthly instead of at longer intervals.

Q. Go ahead?

A. I said that The Ohio Bell Telephone Company repaid certain amounts during those years. Now our plan is this, that the Ohio Bell Company gives us brief notice of the amounts that it is likely to want in the immediate future, and we arrange to provide those amounts. If the Ohio Bell Company finds it is temporarily in possession of some money which it wants to use advantageously, it sends that money to the A. T. & T. Company and the A. T. & T. Company allows the Ohio Bell the same 5.88 per cent; the idea being that we can use the money better than the associated companies can, and in that way it saves interest to them.

The points involved in the service are that the Ohio Bell Company in the first place has been able to obtain money quickly whenever it has needed it. It has not been compelled to buy large sums of money in advance and having [fol. 8413] them lying somewhere awaiting the substantial part of the construction under the annual program.

The rate at which the money has been loaned, 5.88, is on its face very reasonable.

Q. Do you know the amount to be loaned by the American Company to the Ohio Bell Company for the current year 1924?

A. The Ohio Bell have notified us that they would like to get, during the year, at times that they will later decide, about $3,800,000.00.

I might say that in New York we carry a very large reservoir of cash for the purpose of meeting the needs of the associate companies. We carry as high as 90 or 100 million dollars of liquid assets which we obtain through the issuance of A. T. & T. Company stock and note issues, and this money is placed at the disposal of the associated companies as they need it.

Q. Will that amount you speak of, $3,800,000.00, be placed to the account of The Ohio Bell Telephone Company by the American Company during this present year?

A. Yes. The procedure will be that as the construction program matures and money is needed the treasurer of the Ohio Bell Company will send a monthly advice to the A. T. & T. Company of what he needs during the next ensuing period, and when he actually needs the money the chances are that he will telegraph for it and we will telegraph the money so as to save interest while funds are in transit. That is, we try to handle it in the manner which is the most economical, both from our standpoint and the [fol. 8414] standpoint of the associate companies.

Q. You say the chances are it will be forthcoming by way of telegraph. If not by way of telegraph, it will be forthcoming in some way?

A. It will surely be forthcoming unless some cataclysm of the most tremendous kind befalls us.

Q. Are you familiar with the cost of money to a company such as The Ohio Bell Telephone Company, Mr. Crunden?

A. Yes, sir.

Q. Will you discuss that phase for a moment?

A. You mean along broad lines, without getting into detail about the proposition?

Q. Yes?

A. Why, the situation is that there is only a certain amount of investment fund in the country upon which all investors can draw. That investment fund at the present time is somewhat larger than the average, due to the fact that at the present time business is not especially active, and the foreign situation is bad, and a great many foreigners have been buying our securities and sending their money to this country, to a place where they think it will be safe. And as a result of that—and this accords, I believe, with what Mr. Eaton said this morning—the investment market is comparatively favorable, somewhat more favorable than it is likely to be on the average, and more favorable than it was last year.

The Ohio Bell Telephone Company, acting as an independent company, or any public utility of that kind which did its own financing, would necessarily have to go to the [fol. 8415] investment houses or to some wholesale purveyor of capital to obtain the necessary funds for its additions.

The characteristic of public utilities which is most striking in this connection is the great growth of the utilities. I think we brought out here a couple of days ago that the telephone business has increased about a thousandfold since the beginning of the century, and similar tremendous growth has been experienced by other utilities; and they are all anxious to obtain capital, and they will continue to be so anxious, and the draft upon the amount of money available for investments will be very great.

I wonder if I have some figures on that? I haven't the figures that I thought I had here. But the total income—net income, of the United States in a year is about eight billion dollars, and of that amount you can figure on an amount very roughly stated at two millions going into the surpluses of partnerships and individuals and corporations, and disappearing without being reflected in the form of securities.

Then there is another sum that could be roughly stated at another two million, which goes into fixed improvements, such as into farms and into new buildings and things of that kind. That brings somewhere in the neighborhood of

four or four and a half billion dollars into the investment market.

Mr. Burr: Pardon me, I think you said millions in the beginning.

The Witness: That should be billions. That brings about [fol. 8416] four or four and a half billions into the investment market, and from that must be taken care of the needs of the governments, the municipalities, industrial undertakings, and public utilities.

If you will pardon a guess, based on my best memory at the moment, I think the draft of the public utilities upon the available fund last year was in the neighborhood of about one and one-third billion, which is quite a sizable sum.

Now when the public utilities go into the market to obtain money they have to compete like anybody else. There is no royal road to financing for any one, whether it is the A. T. & T. or whether it is some small corporation. They all have to stand the scrutiny of the people who have money to lend.

Of course the usual procedure is to go to such an institution as that represented by Mr. Eaton, an investment house, and the investment house has a corps of experts who scrutinize very carefully the kind of security you have to offer, and they are very careful about whether or not they will take your securities.

They in turn, if they decide to purchase the issue, have to peddle it out, so to speak, to the retailers, and the retailers in turn peddle it out through the bond salesmen who deal with the individual investors.

Now the bond salesman is very careful about what he sells, because his reputation depends on it. There are, of course, bond salesmen that are a little bit imaginative and are quite anxious to sell what they want to sell, but gen- [fol. 8417] erally speaking the bond salesman is a man of high grade and he has a personal clientele, and if the house with which he deals fails to provide the kind of securities which he thinks it is safe for his clients to handle, he is very liable to leave and take a considerable number of his clients with him.

Then there is the investor himself who is becoming better educated in these things, and he is coming to scrutinize ever more closely the increasing number of offerings which are placed before him.

When the public utility goes into the market and approaches the investment banker he must bear this test of comparison with industrial undertakings as well as with other public utilities. The competition with the industrial institutions is a very strong competition and there are several features which the public utilities have to meet, and which they cannot avoid.

The first one is one that was referred to, although not at length, by Mr. Eaton. He pointed out the fact that industrial institutions usually have a very large amount of liquid assets and usually the bond covenants of the industrial enterprise call for the keeping of the large part of the industrial assets in liquid form for the protection of the bond holders.

Sometimes we are asked why we cannot do that same thing. It is impossible for us to do that; speaking from the standpoint of public utilities when I say "our"—our plant is a fixed plant. It cannot be moved. It must be operated. [fol. 8418] What can we offer in place of that? Necessarily we must offer the assurance of continued earning power. Unless there is the assurance of continued earning power for which a large investment has been sunk in the particular locality it is impossible to obtain money for extensions except at a prohibitive rate, which means catastrophe for the enterprise or failure to render adequate service.

The prime thing of course is the assurance of continued earning power.

Another argument we have to meet is that the industrial enterprises have the ability, within the limits of course fixed by competition, *ot* increase prices for that product as they see fit. Of course they are controlled by market conditions, but the market is responsive to the situation as it exists from time to time. Prices change. What have we to offer in place of that?

We must have assurance to place before the investors that when it becomes necessary to increase prices from our standpoint or rates, as we may wish to call them, that the authorities should act promptly, with reasonable promptness of course. Nobody expects that the thing can be done in five minutes.

But it is going to give a detrimental aspect to this whole situation unless we can cure the great body of investors of

the feeling that the utilities are liable to be caught between the upper and nether millstone at various times.

Another argument we have to meet is, people would like [fol. 8419] to put their money in enterprises that can stop expanding when they feel like it. Industrials can stop expanding. If they don't wish to go into the market for more money and prefer a smaller business, they are quite at liberty to do as they please in that regard.

But the public utilities cannot stop expanding. They must give service to the public. They must continue to obtain capital for extensions and betterments. There is no offsetting argument to that. You must meet that condition. If you don't you fail.

Then there is the fourth situation which from the investment standpoint must be considered and in some parts of the country it is more or less serious, and that is what you might call the civic interest in this matter.

The utility company is one side of a bargain. On the other side there are the subscribers to the service and the users of the services of the utility. And naturally they want to make the best bargain they can from their end.

Now if there is protracted litigation and particularly if there is bad feeling, then the investor shies right off the whole proposition.

From the investment market standpoint the main thing is confidence between the utilities and the communities which they serve.

It appears to me that it ought to be so that when the local Chamber of Commerce or any other body, as well as the [fol. 8420] generality of individuals, think of a public utility, that they think of it as they would of any large enterprise in the community of which they had a right to be proud. That is, the Chamber of Commerce will boost the manufacturer of woodenware or bedsteads or anything that helps develop the prosperity of the town.

And looking at it as a long-range proposition, as something we ought by all means develop into if we haven't done it already, we ought to have that same feeling towards the big institutions that share a great part in making the town prosperous.

And the way to do that on the part of the utilities is to come in frankly with the facts and lay the facts on the table and to cooperate by doing their part, to ask nothing that is

unreasonable and to keep their books of account in such a way that when you want to know what the facts are you can get them speedily and courteously. And they must cooperate of course by rendering the best service that they can.
[fol. 8421] Mr. Shuler: The last statement I particularly agree to and recommend to your company.

The Witness: Well, that is the investment market situation and I believe it covers all of the principal points, Mr. Burr.

Mr. Shuler: Now on that last point, I want to accentuate my approval. Will the A. T. and T. Company lay their cards on the table in this case and willingly furnish an accurate account of the receipts and expenditures under the four and one half per cent contract, so that the Chambers of Commerce of the various cities in the State can feel that they can go forward realizing that they are getting fair treatment and good service and reasonable rates—They can go forward and locally boost public utilities, particularly the Ohio Bell Telephone Company.

The Witness: Are you addressing me or Mr. Burr?

Mr. Shuler: You.

The Witness: I thought Mr. Burr had covered that question the other day.

Mr. Shuler: He has absolutely refused to cover it. Answer my question will you. Read it will you.

(Question read.)

The Witness: You understand, Mr. Shuler, that I am here in the same capacity as Mr. Rhodes is, that is to say, my work has to do with methods, financial and accounting methods, and that work I have explained. I do not keep the books of the American Telephone and Telegraph Com-
[fol. 8422] pany and I am not at all certain in my own mind whether the matters that are referred to are germane to this proposition. But at any rate it seems to me that that is a question that should be addressed to Mr. Burr, not to me.

Mr. Shuler: Then personally you feel that you should only lay on the table such cards as you employees of the A. T. and T. think the people should have.

Mr. Burr: He has not said that at all.

The Witness: No, I have not said that. There is no use giving that sort of twist to it. If the information was

germane to the proposition, you should receive it. But if it is not germane, then there would be nothing gained by producing it.

Mr. Shuler: Very well, I will take your answer on it. Who is to decide whether or not it is germane, the A. T. and T. Company or the public.

The Witness: Mr. Shuler, that seems to me to be bordering on or to enter into an argument with the witness on a subject with which he is not conversant. I have tried to keep to those things I know and not wander all over the map.

Mr. Shuler: Mr. Condon you said that the Chambers of Commerce should boost public utilities.

The Witness: I do. I think not.

Mr. Shuler: And that the public utilities should be fair and lay their cards on the table.

The Witness: Just *have* you have endorsed that I re- [fol. 8423] endorse it, Mr. Shuler.

Mr. Shuler: And I use your own words. Now you have shown a somewhat extensive knowledge of the financing of the A. T. and T.; you have shown somewhat extensive knowledge of where they spend their money, what they do with their money?

The Witness: Yes, sir.

Mr. Shuler: Now it is just inconceivable to me that if you are here expressing A. T. and T.'s public policy ideas that you cannot get back to A. T. and T. and get from them the things I have asked you to get when you again come here and tell us you have gone through their records and given us the amount of money they spent or loaned you in Ohio.

The Witness: Well, I have given you information from figures that come before me, and I am not in position today to give you information about figures with which I am not familiar.

Mr. Shuler: I realize that. But will you give them to me within two or three weeks or a month?

Mr. Burr: Do you even know whether such figures are available, Mr. Crunden?

The Witness: I know the figures we file with the Interstate Commerce Commission at Washington are available. They are general figures. I do not know whether they are split up in categories that will be useful to Mr. Shuler.

Mr. Shuler: No, they are not. That is the idea I want [fol. 8424] to express. But you do know, Mr. Crunden, that Mr. Gifford furnished to the New York Public Service Commission these figures for the years, 1921 and '22 do you not?

The Witness: Yes, I remember seeing that at the time. That was one of two occasions on which I saw such figures.

Mr. Shuler: The next question; you also know that Mr. Gifford issued those in somewhat an allocated shape by several exhibits.

The Witness: Yes, sir, he did.

Mr. Shuler: Why can't you do that for the Commission in Ohio? You do not play favorites among the commissions do you? Let me ask you another question.

Commissioner Maullar: Lets see. He has'nt answered your last question.

Mr. Shuler: Why can't you favor the Ohio Commission by furnishing them the same material and evidence that you did the New York Commission.

The Witness: That seems to be addressed to me as if I were one of the executives of the Ohio Bell Company or the American Company.

Commissioner Maullar: You may state whether or not that is within your authority.

The Witness: I am simply a methods man, coming here to tell about a portion of the work that I perform.

Mr. Shuler: My only objection is the gentleman comes here and lectures Ohio Chambers of Commerce for not [fol. 8425] being fair to his utility.

The Witness: No, emphatically no. I must protest against that even to the extent of being discourteous. I am talking about a country wide situation.

Mr. Shuler: Ohio, in connection with other states of the Union.

The Witness: No, not any states of the Union, but I am simply telling you what I know is in the minds of the investor. I am not going to give you my own ideas. I cannot be construed to lecture you. God forbid! But I want to put the facts as I see them in the record when I have been asked to. I have not exaggerated the thing at all and I do not think I have stressed the thing unduly.

By Mr. Burr:

Q. Nor do you state that any Chamber of Commerce has been unfair in the matter?

A. I think generally in the past few years they have been fair and I think they are beginning to see into this proposition from the investor's viewpoint. Let me elaborate on that a little.

Mr. Shuler: Why? Why take the time.

The Witness: It is simply this. It is quite an important point.

Mr. Shuler: Maybe you can tell us quicker than you explain what I asked you.

The Witness: We have got to rely—When I say "we" I mean public utilities, generally—On Mr. Average Man for the money in the average public utility. We cannot rely [fol. 8426] upon the rich, because the rich are relatively speaking a negligible quantity in providing funds enough for industrial developments or at least for public utility development. Every time that we put out an issue we have very small amounts taken by great numbers of people over an extended area. Consider for a moment our experience in the war. The way the Fourth Liberty Loan went over was an eye-opener to financial men throughout the country.

Mr. Shuler: Oh, gee, we read all of that stuff.

The Witness: And we must get our additional funds in that same way from a vast number of investors.

Mr. Shuler: Widows and orphans?

The Witness: No, not widows and orphans necessarily. We must sell our securities to insurance companies in which tens of thousands of people are interested. We are making a strenuous effort to get Bell issues which can be carried by savings banks; we are trying to sell preferred stocks to customers; and nothing could be done that is better than this idea of customer ownership. It is a splendid step in the right direction.

By Mr. Burr:

Q. How many stockholders are there in the American Company?

A. Why let me see. I think I have that.

Mr. Shuler: Is that all of value on the four and one half per cent contract.

Mr. Burr: I thought the Commission would be glad to have this evidence.

[fol. 8427] The Witness: At December 31st, 1922, there were 249,600. I do not know how many it is today, but I know our people feel that the day is not far distant when there will be a half a million.

Mr. Harshman: What does that represent? Owners of preferred stock?

The Witness: No, that represents stockholders in A. T. and T. company stock.

Mr. Harshman: Preferred and common both?

Mr. Shuler: They only have one.

The Witness: That is the common.

Mr. Harshman: Common American Telephone and Telegraph Company stock.

The Witness: Yes, you understand our general line of thought in the Bell system. Our plan is this, that the A. T. and T. Company should be the foundation structure of the whole business, and that they should issue common stock. Then they also obtain funds, borrow money and advance that money to the local companies for use. With the money that they obtain, they also purchase the common stocks of the local companies. From time to time when there is a considerable amount of property that has been accumulated in the plants of the local companies, that is not covered by bond issues, favorable opportunities are taken to float first mortgage issues on those properties, and until a favorable opportunity comes to extend the amount issued under such first mortgages, we aid the associated companies in obtaining the money on the best terms, usu-[fol. 8428] ally by this proposition of advances. Then the common stocks of the local companies go into the hands of the American Company and are made collateral for bond issues and note issues on which we obtain money in the New York Market for the further use of the associated companies, and back of the whole thing stands the common stock of the American Company. It is a much better stock than any common stock of a local telephone company could possibly be for this reason, that investors in general do not like to place too much of their eggs in one basket. They distribute their risks in the same way in-

surance companies distribute their rates, and no one ought to own more than a moderate amount of any one stock. He ought to distribute his holdings if he is wise. The A. T. and T. Company because of its country-wide nature and country wide extent of its service is not putting your eggs in one basket but is equivalent to putting them in a multiplicity of little baskets throughout the country, and it furnishes that tremendous stability of which Mr. Eaton spoke.

Q. Do you know how much the American Telephone and Telegraph Company paid for its common stock of the Ohio Company that it owns?

A. I don't know.

Mr. Shuler: I object to the question.

Mr. Burr: That is a matter of record before the Commission.

Mr. Shuler: You know this testimony I have been speaking about of Mr. Gifford was given before the New York [fol. 8429] Commission.

The Witness: Yes, sir, I read it.

Mr. Shuler: You know after that hearing and having heard and having been given that information they reduced the four and one half per cent contract to a $2.10 per station base did they not, if you know?

The Witness: I am not positive about the amount, but it was some such proposition.

Mr. Shuler: $2.10. Take my word for it.—No, $2.00; one dollar for the instrument and one dollar for the other service.

Mr. Burr: Who did that.

The Witness: That was the case that subsequently went into the Federal Court.

Mr. Shuler: That is what happened?

The Witness: Some such action as that, yes, sir.

Mr. Shuler: You know in Indiana they had certain information didn't they, or are you not familiar with that case?

The Witness: No, I am not with that.

Mr. Shuler: Are you familiar with the Michigan case.

The Witness: Yes, I have some familiarity with the Michigan case.

Mr. Shuler: What did the Commission do there after hearing this evidence?

The Witness: They did various things, the result of [fol. 8430] which was we went into the Federal Court.

Mr. Shuler: No, I mean on the four and one half per cent contract. Please answer the question.

Mr. Burr: Just a moment.

Mr. Shuler: Is asked him what the Michigan Commission did on the four and a half per cent contract after hearing this evidence. He may answer if he knows. If he does not he can say, "I don't know."

Mr. Burr: Mr. Shuler, you know quite well that the best evidence of what the Michigan Commission did in that case is to go to the record of the case and prove it here and not ask the witness for the telephone company as to what the Commission did or did not do in that case.

Mr. Shuler: And Mr. Burr, I equally know that the best way to get the record of the loans made by the A. T. & T. Company to Bell is the books of the A. T. and T. Company, and not allow this man to testify to it.

Commissioner Maullar: We are getting far afield. If the witness knows he may answer the question. If he doesn't he can say he doesn't know.

The Witness: I don't remember what the decision was in that regard. I know that they made some strictures regarding the method of making the payment.

Mr. Shuler: If he does not he can say he does not know.

The Witness: I do not know what the decision was in that regard. I know that they made some strictures re- [fol. 8431] garding the method of payment.

Mr. Shuler: That is all.

Mr. Miller: Have you access to the books of the A. T. and T?

The Witness: No, sir.

Mr. Miller: You had access to get the amount of the loans made to the Ohio Bell?

The Witness: Yes.

Mr. Miller: Can't you get access to get this other information which has been asked for?

The Witness: I was directed by the comptroller of our company to get this information for this case. Otherwise I would not have gotten any such information.

Mr. Miller: You did that under his authority?

The Witness: Yes, because my work does not go to that feature of the work of our department.

Mr. Shuler: Mr. Crunden, do you know whether or not the person in charge of those accounts has the same views as to laying the cards on the table as you have?

The Witness: I think he has, yes, sir.

Commissioner Maullar: Oh, no, that is not important.

The Witness: I think it is the policy of the Bell system to give every publicity necessary and you won't find, Mr. Shuler, any corporation that issues more frank and full annual reports than the American Telephone and Telegraph Company. That has been our custom for years. [fol. 8432] Mr. Shuler: I like Mr. Vail's statement in his report of 1913, very much, but I am sorry they are not carrying it out.

The Witness: They are carrying it out.

Commissioner Maullar: Oh, gentlemen, don't argue.

By Mr. Burr:

Q. Mr. Crunden, will you tell us briefly what auditing work is done by the comptroller's department of the General staff for the associated companies?

A. We send traveling auditors to Cleveland and make an extensive annual balance sheet and income statement audit and a method inspection of the Ohio Bell Telephone Company regularly. We do that regularly each year. Last year it took two experienced men six months to do that work, and in the preceding year it took three men four months.

Q. Do the American Telephone and Telegraph auditors make the audit or do they assist the local auditor?

A. They made the audit. It is an outside audit so far as the auditor of the Ohio Bell is concerned. He does not get in on that work.

Q. How extensive is the audit?

A. It is quite an extensive piece of work. It is more extensive than the average audit would be by a certified public accountant, for the reason that our men are not merely good accountants, but they are also telephone men and they go with a fine tooth comb into whatever branch of the business they feel like.

[fol. 8433] Q. Have you the means of knowing what it

would cost the Ohio Bell Telephone Company to make such an annual audit with its own staff.

Mr. Shuler: I object to the question.

Commissioner Maullar: The question is if he has the means of knowing. The objection will be overruled.

The Witness: Well, I think that for the kind of men we sent out there, they charge $25.00 a day per person, and there would be six months work and there would have to be some overhead profit for the house that did the work.

Q. Why are such audits necessary?

A. They are necessary in the case of the Ohio Bell Company to insure that the accounting continues to conform in every respect with the accounting requirements of the Interstate Commerce Commission, and they are also necessary for general reasons, that is to say, to furnish the stockholders, the directors and the executives of the company with a correct statement of the condition of the business, and expert certification of its balance sheets for publication purposes and for the use of bankers and others who are interested in its securities. All companies of such standing have such audits. They are an indispensible feature of all such work.

Mr. Shuler: The A. T. and T. takes all the Ohio Bell Securities.

The Witness: I am answering in general. We do not hope that the A. T. and T. will continue to advance the [fol. 8434] money to the Bell forever. There must come a time when a good-sized first mortgage should be placed upon the property and the investment burden taken by the investors, preferably investors in Ohio.

By Mr. Burr:

Q. Does your department assist the associated companies in the selection of suitable accounting machinery and devices?

A. Yes, sir, we do that. In fact I brought a sample of that I think. In general our work along this line is the investigation of various devices made by different manufacturers for the purpose of recommending to the associated companies those devices which are mo-t suitable for their work. We receive inquiries from time to time from associated companies regarding the capabilities and pos-

sibilities of this machine or that, and usually we have already made careful investigation of it and are able to give them the information. If we haven't got such information we make the necessary investigations and tests to obtain it, and that is a regular feature of our work.

Q. Will you take just a single example?

A. This example that I brought along is a toll billing machine, that we recently recommended for the use of the associated companies.

I have two photographs of it.

Q. There are two photographs of it are there not?

A. Yes, sir.

Mr. Burr: The two photographs may be marked Crunden Exhibit Number 22 and Crunden Exhibit Number 23 [fol. 8435] respectively, and they are offered in evidence, the one marked Crunden Exhibit 22 showing the front of the machine, and that marked Crunden Exhibit Number 23, showing the reverse side of it.

And thereupon the photographs above referred to were marked for the purposes of identification and were offered and admitted in evidence on behalf of the Ohio Bell Telephone Company, and are herewith submitted marked respectively Crunden Exhibits Numbers 22 and 23, and made a part hereof.

Q. Will you explain the two exhibits please?

A. These are photographs of a toll billing machine recently developed by my department, and it is designed to facilitate the work of preparing the statements furnished to subscribers. Upon the front view of the machine you will see a special bill shute that we developed which by an easy motion brings the toll statement to the point where the information is to be written. The machine is motor driven, and there is a tabulating arrangement which enables the machine to be worked in the most economical manner; that is to say, you write the date, and then the machine jumps to the point where the name of the town is to be written, and when you have written the name of the town, by striking the bar it jumps to the place where you insert the amount of the toll charge, and then it goes over to where you write the tax and the amount of the tax is included on separate keys which are shown at the [fol. 8436] righthand end of Exhibit 2. It says, "Tax

five cents" and "Tax ten cents," and you can strike the ten cents with one blow of the key. Immediately you do that the machine returns of itself to the point where you write the next, that is to say, it jumps up to the next line and also jumps back across the machine.

Q. In the same true of the ten cents tax key?

A. Yes, sir. At the same time there is an accounting mechanism there which enables her to tell the amount of the tax without adding it up.

Q. That is figure five?

A. Yes, sir. That machine has resulted in cutting down the time of doing the toll billing about 20 per cent, and the saving to the associated companies throughout the country is on the order of $150,000.00 for the year 1924.

Q. Are those machines in use by the Ohio Bell Company?

A. Yes, I presume they are. In fact I have no doubt that they are.

Mr. Shuler: He presumes they are. He has no doubt they are. He doesn't know a thing about it.

Mr. Snook: Does that machine accumulate the totals too?

The Witness: The totals of the tolls?

Mr. Snook: Yes, the totals of the bill.

The Witness: No, we find that that can better be done by comptometers, because there are only a few amounts to be added on each bill.

Q. Have you any bulletins illustrating the services [fol. 8437] rendered to the associated companies by your statistical department?

A. I think I have a few.

Q. We would like to have you produce if you please a few typical ones. Have you one containing frequency curves and averages?

A. Yes, sir.

Mr. Burr: It may be marked Crunden's Exhibit Number 24 and is offered in evidence.

And thereupon the bulletin above referred to was marked for the purposes of identification and is herewith submitted marked Crunden's Exhibit Number 24 and made a part hereof.

Q. Explain, Mr. Crunden, Exhibit 24 very briefly?

A. That bulletin had to do with the proper methods of determining frequency curves and averages. There is a large quantity of such work necessary in the Bell system. You will find examples of this in the bulletin. There are a number of examples for illustration which relate to the use of measured service. But the amount of such curves is extensive throughout the business. Now we found it desirable to issue that bulletin in order to show what kind of averages it was desirable to use in different kinds of mathematical work. Sometimes simple arithmetical averages are suitable. In other cases geometrical averages. At other times it is necessary if you are going to get correct results to use the harmonic means. And so on. And that bulletin has been helpful to the associated companies in that [fol. 8438] respect. It is typical of a class of bulletins that our statistical division puts out in that regard. Have you a bulletin showing the statistical analysis and projection of time series?

A. Yes, sir.

Mr. Burr: It may be marked Crunden's Exhibit Number 25 and is offered in evidence.

And thereupon the bulletin above referred to was marked for the purposes of identification and was offered and admitted in evidence on behalf of the Ohio Bell Telephone Company, and is herewith submitted, marked Crunden's Exhibit Number 25 and made a part hereof.

Q. Will you explain briefly Exhibit Number 25.

A. Exhibit Number 25 has to do with the projection of time series. We have found that with the very large investments which the Bell system has in telephone properties and it is very important to keep close watch on the ebb and flow of general business and the volume of production, and we are now studying the best ways of keeping that watch. I give this bulletin as an illustration of some of the work that is now under way. It is more or less of a tentative bulletin, and the advantage of it lies principally in the future. And its possible advantages are very great indeed, because if we can more accurately time the periods when great sums of money are required and if we can estimate with close accuracy the time when additional forces must be

[fol. 8439] trained in advance for construction projects, and if we can tell in advance the time when business is going to slacken up seriously, making it necessary to make radical adjustments in our forces, we can run the business most efficiently. It is also necessary to have such information in order to purchase huge quantities of materials at the right times. The whole subject is quite complex but considerable headway has been made with it, and there is no doubt but in a few years our information regarding it will be very much more expensive than now. To give you an idea of what I have in mind, turn to page 17 of the present exhibit. On page 17 is shown a chart Number 8, a comparison of originating calls and general business in terms of standard deviation.

I won't stop to explain standard deviation, because it is fully explained in the bulletin. You notice we have established a very close correspondence between the original calls and the curves of general business, and there is the peculiarity that the originating calls evidenced by the heavy line fall off, that is to say, in times when business is dropping off the number of calls falls off a little ahead of general business.

One of the outstanding facts of modern economic organization is the regularity with which periods of business activity and depression follow. Every period of prosperity seems to be followed sooner or later by liquidation, culminating in commercial crises and in some cases, as we remember, in 1893 in a panic. A period of depression is sure to [fol. 8440] be followed again by a business revival, and business revival is followed again by prosperity, and the cycle begins anew.

Now if we refer here to the year 1904 and the year 1905, the first stage of the business cycle is the state of revival. During depression costs of business have been lower and accumulated stocks have been worked off. Interest rates and prices have fallen and business activity is at a low point. Under these low cost conditions there usually develops a demand for some articles of stable goods, and this leads an activity in those lines, and this activity is followed in certain lines of business, which reacts on other lines of business, which, as they revive, react on still other lines, and thus gives the accumulated effect, profits increase with the increased volume of business, and as a result, business confidence returns. Eventually business men get courage

to embark on other projects and there is a feeling of prosperity. The second stage of that of prosperity, which you will notice is shown by the chart in the latter part of 1906 and the early part of 1907. In this stage confidence is very high, business is brisk, output expands, wages rise, prices of materials are pushed up, advanced prices of all sorts are cheerfully paid and there are higher costs incurred for overtime, the demand for money is very high and interest rates rise to their highest level. This vast business causes stresses and strains in the business organization. Prosperity usually has an adverse effect on business morale, [fol. 8441] speculation increases, conservatism decreases, and at length the banks and other creditors become apprehensive, lines of credit become restricted, demand decreases and the continuous volume of goods coming to market causes a surplus. This brings about the third stage of liquidation. Liquidation appears here in 1907 and again in 19-3 and 1914 and again in 1918. In this stage business concerns begin*g* to press hard their debtors for prompt payment. The credit strain becomes extreme and interest rates very high. Liquidation spreads throughout the whole business structure and eventually there is a crisis. The fourth period is one of depression. Crisis merges into depression, volume of business is low, prices fall, wages fall and as a result unemployment becomes severe, efficiency increases, cost of business decreases, failures are frequent. And then you start through the same cycle again as is set out on this exhibit toward a normal volume of production again.

The information on which we base the originating calls on Chart 8 has to be worked out from the information in chart 7, which shows the originating calls by months with their characteristic seasonal fluctuation and long term trend. We have to eliminate both the seasonal fluctuation and the long term in order to reduce them to a normal basis for comparison with some other index of the volume of business. This is work with which we are familiarizing the associated companies and we expect that over a term of years it will prove to be very valuable and make considerable [fol. 8442] savings for the associated companies. It is one branch of statistical work by which I illustrate the general nature of the work. I do not mean in offering this to offer it as our principal activity, but simply as one basis out of many in statistics which is a very broad subject and a sub-

ject which is greatly expanding at the present time. Concerns are getting so large that they can be operated better when they are large and can take advantage of large scale production——

Mr. Shuler: You are speaking of telephones now?

The Witness: And of statistics that are valuable aids to them.

Mr. Shuler: You are speaking of telephones when you make that statement?

The Witness: I was speaking of business in general and the necessity of dealing in the most efficient way with the purchase of large quantities of supplies and the provision for additional employment and foresight as to whether employment is going to fall off and so forth and looking forward to the future market for money and interest rates in the telephone business.

Mr. Harshman: Are the calls upon which these charts were based business calls or are they calls from both business and residence?

The Witness: I think they were all of the originating calls in that change, and those were calls in an eastern city. We have made studies of that sort for all kinds of other [fol. 8443] matters besides calls. I might say that we consider in the telephone business that our accounting and statistical department is not merely the fact gathering department of the business but also the fact distributing and the fact interpreting branch of the business, and we aim to have the general auditors and their associates of the greatest possible assistance to the executives.

Q. Did the American Telephone and Telegraph Company through its general staff assist the associated companies, including the Ohio Bell, in organizing an employees' benefit fund?

A. Yes, sir, they did. They worked out the general plan that was most desirable after a long investigation. I think Mr. Gifford did a large portion of the work on that investigation. We suggested to the associated companies the amounts that it was desirable for them to set aside out of surplus to start the employees' benefit fund, and the rates upon which charges should be made in order to maintain it. The American Company also started the fund and entered into an agreement with the associated companies that if the

associated companies would set aside at least two per cent of their annual pay rolls.

Q. For what purpose?

A. For the purpose of paying the employees' benefits in their respective companies, that should such amounts prove insufficient, the American Company would from its fund make up the deficiency but not to exceed one half million [fol. 8444] dollars per annu-. That gave the associated companies the necessary moral support to go ahead and institute the funds, and they feel that the American Company's funds are back of them, of their own, should they fail, and the introduction of the fund has had a wonderfully good effect on the employees.

Mr. Shuler: We have a compensation law in Ohio you know.

The Witness: Yes, sir, but you have no pension law for public utility employees in Ohio, I think, and no sickness benefits either.

Mr. Shuler: Yes, sir, if protracted, if contracted in the course of the business.

The Witness: But this covers any kind of sickness.

Q. Do you know whether the benefits payable under the fund are greater than those provided for in similar cases by the workmen's compensation fund of Ohio?

A. That is my impression from old days when I was auditor of disbursements of the Ohio Bell, but after this lapse of time it is nothing more than an impression.

Mr. Shuler: He does not know what we pay in Ohio.

Mr. Burr: He knew it as a fact at the time he was here in Ohio. I think that is all at this time, Mr. Crunden.

By Mr. Shuler:

Q. In your accounting department, do you pay any attention at all to cost of operation accounting?

[fol. 8445] A. Cost of operation accounting of the associated companies?

Q. Yes? Do you know and do you keep track of the per station cost of operation of the various subsidiary or associated companies?

A. Yes, we keep track of that, and also we make a great many other measurements.

Q. Just please answer my question. We can get along very nicely then. Do you know what the per station cost of operation of the Ohio Bell Company is?

A. No, sir.

Q. Do you know what the per station cost of operation of any other subsidiary on the American Telephone and Telegraph Company is?

A. No, I do not. I have no such figures with me.

Q. Do you acquaint various subsidiaries with the fact that one or the other is higher or lower?

A. We do, we issue a large amount of comparative data on various phases of the business.

Q. How does the direct station cost of operation vary with the size of the exchange.

A. There is a tendency for the expense of operation to increase as the size of the exchange increases.

Q. Take an exchange with one hundred thousand stations an exchange with one hundred and twenty five thousand stations and an exchange with one hundred and fifty thousand stations and an exchange with one hundred and seventy-five thousand stations, what should be the increase, the ratio of increase?

A. Oh, you couldn't get any such thing. You would have [fol. 8446] to study carefully the different exchanges and see what their characteristics were. One exchange might be a very big exchange and the other might be spread over a large territory and have a lot of farmer lines, and one town might be largely industrial and the other might be a community of farmers living in the town, without much industrial development. There are all kinds of things entering into that. Nearby markets for labor might have a bearing. If you are operating an exchange to Chicago and the people can go into Chicago and get better wages, they will go. And without carefully evaluating all of the elements in the thing, you are not going to get any answer worth while.

Q. You don't think there is any value in comparative studies of the different exchanges on that subject?

A. No, except in a very broad way. That is, if you had one exchange that was probably tremendously out of line it would put you on your guard.

Q. You are familiar now with the cost per station of operation of the various exchanges of the subsidiary com-

panies of the American Telephone and Telegraph Company are you not?

A. No, I am not familiar with that, except that we did have such information.

Q. Have you any idea what direction station cost from your experience in the doing of this kind of investigating—have you any idea as to what the per station cost is which you have in Cleveland, Ohio?

A. No, I have not. I would not go at it that way to work it out.

[fol. 8447] Q. What do you say?

A. I have not, and I should not go to work that way to get the information.

Q. What information?

A. Information bearing on the operations in Cleveland. I don't think you can divide stations into operations and get a figure there that is worth more than a general indication.

Mr. Shuler: That is all.

COLLOQUY

Mr. Burr: It is now almost closing time. I would suggest we suspend here rather than start with a new witness if that meets with the approval of the Commission.

Commissioner Maullar: Have you another witness?

Mr. Burr: Oh, yes, we have at least two more.

Commissioner Maullar: How much time will you take in direct on this?

Mr. Burr: We will want all of two days.

Commissioner Maullar: Can you be prepared for instance if we set three days in April—could you be prepared to proceed with your cross examination at the end of the direct examination of these two witnesses?

Mr. Shuler: If they will tell us what those two witnesses are to testify to.

Commissioner Maullar: I mean cross-examine those who have testified?

Mr. Shuler: Yes, I think so.

Mr. Burr: Your Honor will remember that the week of March 24th is also set aside for this case.

Commissioner Maullar: That is set.

[fol. 8448] Mr. Burr: My suggestion would be that in that week we go on with the witnesses which we have and that we

ask the gentlemen on the other side to be ready to cross-examine those who have already testified during that week.

Commissioner Maullar: That is a week set apart for something else.

Mr. Harshman: The week of the 24th is set apart for further evidence on the toll question, not on the four and one half per cent question.

Mr. Burr: My suggestion is we could make time by considering that say the first two days of that week or the last would be consumed in the testimony on the general toll valuation, general toll question, and that the last three days could be devoted to finishing our case and such cross-examination as you could get in at that time.

Commissioner Maullar: Will that be agreeable? Then we will set this for the following week.

Mr. Harshman: It will not be time for us to get a transcript so that we can be prepared for cross-examination. We are not going to be able to get that transcript for about three weeks. That is the way it usually runs. Sometimes it has been longer. It is going to take us some time to go over it, because there have been questions asked here and dissertations running on for fifteen or twenty minutes. It is a voluminous transcript. There isn't anything to be gained by setting a date now and finding we cannot fulfill it.

Commissioner Maullar: We will proceed as far as we can [fol. 8449] with the toll proposition at that time, and then there are two additional witnesses here for the company to be heard anyway. We can finish that. Possibly it would be only a remnant of your time to proceed anyhow.

Mr. Shuler: We might find at that time that we could go ahead with some of the cross examination. I think it is well to hold those days open, but not bind us as of that date for cross-examination.

Mr. Burr: Let me suggest this, that the week of the 24th be held as it now is and at that time the telephone company will finish its case in chief on all questions, including the license contract.

Mr. Shuler: And as I understand you, the first two days will probably be for toll.

Mr. Burr: For toll only, yes. I think that is about the way it will run. I should think the first two days anybody not interested in the license contract question need not be here.

Commissioner Maullar: Those interested in the four and

one half per cent contract, be here the last three days. Now I would like to have you agree on what date you want to continue this following that.

Mr. Shuler: You suggest something about the third, fourth and fifth of April, but that is too close.

Commissioner Maullar: We ought to be far enough along with the A. T. and T. four and one half per cent case that it could be completed on April 17th and 18th.

Mr. Burr: That is when the cross examination will take [fol. 8450] place. That will allow three days in addition to what you have at the end of the week of the 24th in cross examination.

Mr. Harshman: That will not get us anywhere because it is going to take a whole lot more time. Hadn't we better take a date when we have some assurance of completing it.

Commissioner Maullar: We have the calendar now that is marked up for weeks. We don't want to be all summer in trying these cases. We want to get an opportunity to get the facts before us so we can conclude these cases without unnecessary delay.

Mr. Burr: Then we have April 16, 17th and 18th?

Commissioner Maullar: No, the protest to the Akron valuation is on the 16th. That is on Wednesday. Well, one one of these dates I see the Barberton case is set, on the 22nd I think. Let us assign the week of April 21st. We ought to get time enough beginning at one thirty P. M. for cross-examining on the license contract testimony.

Mr. Burr: And for the introduction of testimony of the other side on that subject.

Commissioner Maullar: Yes, we might change Barberton to the following week, April 28th at one thirty.

Mr. Harshman: Then do I understand that this goes ahead on March 24th at one thirty.

Commissioner Maullar: Yes, 24th and 25th, complete the [fol. 8451] toll case, 26th, 27th and 28th complete the license contract in chief and any cross examination, and April 21st cross-examine on the license contract and in addition the testimony on the other side so far as it is possible.

Mr. Shuler: Before we adjourn I want to move for all of the cities who have been represented here, unless some of them want to object, that this Commission notify and direct that the Ohio Bell Telephone Company procure and present at a session of the hearing herein—and I will make that specific as of March 26th—The following information and data.

(a) The total receipts of the American Telephone and Telegraph Company under its sub-license contract popularly denominated the four and one half per cent contract, all telephone companies operating under and pursuant to the terms and provisions of such contract for each of the calendar years, 1919, 1920, 1921, 1922 and 1923;

(b) The total expenditures made by the General Staff of the said The American Telephone and Telegraph Company in each of said calendar years aforesaid, from the receipts under the said four and one half per cent contract; and,

(c) A detailed account of such expenditures by the said General Staff on the said American Telephone and Telegraph Company in the calendar year, 1923.

If however it is convenient to the American Telephone and Telegraph Company or the Ohio Bell Telephone Com-
[fol. 8452] pany to give us the year 1922 in a more expeditious manner—what I mean by that is, if they have it already for the year 1922—I will waive 1923.

If the Commission cares to hear any reasons I will state them in just a couple of words. Wherever these details expenditures have been exhibited, the Commissions have invariably said absolutely that the four and one half per cent contract was unscientific, illogical and unreasonable. Other commissions have said that without this data before them. But both recently the Illinois Commission have refused to lower the license payment beyond $2.10 per station, which is much lower than four and one half per cent, because the city had not shown the Commission the cost of this service to the American Telephone and Telegraph Company. All commissions are beginning to recognize and realize that that element of cost is a determining factor. And that is the reason we want to be in a position to show this commission what that cost is, so that this commission can intelligently arrive at some conclusion as to what the payment should be, rather than simply guess that because of mass formation of hundred and hundreds of pamphlets issued since 1889, as to what should be paid.

I do not want to state it as a fact, but I have a recollection that some of the courts have also said that they have not been given the cost of that service to the A. T. and T. But I do say it unqualifiedly, that in every case that the courts have allowed it, and in every case that the Commission has al-
[fol. 8453] lowed it,—if this Commission would go into those

cases, get a statement of the facts, you would find where it has been allowed, it has been allowed, not on the ground that a thorough investigation was right, but after hearing the A. T. and T's side of the case and nothing on the other side except perhaps a cross-examination, that the village or city had not made out a case to the contrary. Now it is absolutely essential for us to make a case to have this cost and these expenditures. I stated it as a fact today—the other day I did not—that in 1922—at any rate it will appear in the New York Commission's investigation—1922 I am certain—the receipts under this contract were seventeen millions of dollars and more, that of those receipts less than ten million were expended in this work. Now that is the statement of the company as I have it from these reports. Mr. Crum of Chicago has allocated this ten million dollar expenditure on a 50-50 basis. The reason I think I am stating the truth there is because it is verified somewhat by Mr. Crum's analysis of the A. T. and T. report to the Interstate Commerce Commission. Mr. Crum took that statement and analyzed it, and his and Mr. Gifford's statement do not vary very much on the amount expended by the A. T. and T. Mr. Gifford's statement of the amount expended in that year that he investigated was $7,750,000.00, and Mr. Gifford's statement my recollection is, is $9,900,000.00. Mr. Crum, after an investigation in an attempt to allocate the moneys spent that the advantage to the A. T. and T. of the $7,750,000.00 spent, [fol. 8454] the advantage that the A. T. and T. derived from it, was $3,775,000.00 and that the advantage which the associated companies, Bell Companies, received from it, were $3,775,000.00. And yet they are making the Bell Companies pay $17,000,000.00 in that year. And just as illustrative of what I have in mind and what we think this Commission should have in this case, in 1918 the Bell Companies in Ohio, exclusive of Cincinnati, paid into the A. T. and T. coffers $153,600 some odd dollars. In 1923 those companies paid into the coffers of the American Telephone and Telegraph Company $1,081,000.00. In five years an increase from $153,000.00 to a million eighty one thousand dollars.

Mr. Cooper: You are wrong about that.

Mr. Shuler: If I am, it is because your company has made a wrong report to the State of Ohio and the Public Service Commission of New York. Those are my authorities. Now just a specific instance. They had two companies, same number of zones, approximately. By a simple method

of unification 100 per cent more is turned into the coffers of the A. T. and T. Company under this four and one half per cent contract. How anybody can honestly and conscientiously justify that is beyond me. And besides all that 50 per cent of those 88,000 telephones in Toledo, the parts, were not furnished by the A. T. and T. Company. In Cleveland we have 165,000 stations.

Mr. Cooper: About, yes.

Mr. Shuler: Of which about 30,000 were originall[illegible] Ohio [fol. 8455] State. By the unification, which was done and paid for the benefit of the A. T. and T. and is a good thing I have no doubt——

Mr. Burr: For the subscribers.

Mr. Shuler: Because I always agreed that the telephone business should be a monopoly—we have there now a situation where they are receiving approximately one hundred thousand or more dollars—I am conservative—one hundred thousand dollars more paid into the coffers of the A. T. and T. Company, although thirty odd thousand of those instruments were never furnished by the A. T. and T.

It is just such illogical things as that that makes it perfectly plain that this four and one half per cent cannot be justified, simply because it costs somebody a few dollars more to keep the books. Because it costs a few dollars more to keep the books we are going to give to these A. T. and T people hundreds of thousands of dollars.

Besides, how can anybody justify this proposition? Prices, wages go up, the Ohio Bell Company asks an increase of rates. Why? Because they want to pay a living wage to some employee. This Commission takes it into consideration and says, "These people are entitled to more money". And every time you do it you are spending that much more money for the benefit of New York City.

Mr. Burr: Not a particle of it.

Mr. Shuler: You get the total revenues and off of the [fol. 8456] total revenue you get four and one-half per cent.

Mr. Burr: The question of the payment of a living wage does not affect the amount paid on the contract.

Mr. Shuler: Every time you raise your wages, you raise your rates, and every time you raise your rates you raise the revenue.

Mr. Burr: You are mistaken, Mr. Shuler.

Mr. Shuler: For that reason I make this motion and I think this motion should prevail and this Commission should

order that company to do what Mr. Crunden said, "Put your cards on the table".

Mr. Burr: First, your Honor, we are here in the midst of company's proof on that subject, and counsel's request, rather his demand, which has been made from time to time during this hearing and which is stressed so much, at this time is premature. In the second place, after the company has closed its case, we expect that it will have been shown in the evidence conclusively beyond even the possibility of argument that the Ohio Bell Telephone Company receives many many times the value, many, many times the cost, of these services to it. To use the figure which has been spoken of here from time to time, is that *that* the payments by the Ohio Bell Company to the American Company amounts to one million dollars a year, we expect to show that the value of those services to the Ohio Bell Telephone Company is many many times that one million dollars. What the commission is concerned here with is whether or not the Ohio Bell Company is getting value for the amount paid—services [fol. 8457] rendered. If it is receiving value, and I say it is receiving many times in the value of services, then the question of what it may cost the American Company to furnish these services is altogether beside the question. I do not care, however, at this time to go into that question at all. Suffice it to say that at this point where we are in the midst of our case and have yet to evaluate some of these services furnished by the American Company—when I say, "Evaluate" I mean evaluate them from the standpoint of the Ohio Bell Company, certainly the demand of the gentleman on the other side is premature.

Mr. Shuler: I have only one thing to say on that and that is this. I do not want to be in the position, Mr. Commissioner, of having them say sometime hence, six weeks or so, "My God, how do you expect us to get that together?" The Commission has indicated that it desires to close this case before the summer. And the purpose of making this motion at this moment is that I cannot be accused of waiting until the last moment to give them plenty of time to furnish it, and if they will furnish it within a reasonable time before the case is closed, I shall be content. But I do not want to be put in the position of having them say, "Well, why didn't you tell us this before". I want to give you plenty of warning, plenty of time to get the information.

Mr. Burr: There is only one thing other that I want to say

on this subject and that is I take exception to what counsel [fol. 8458] has said as to the proof on the subject of receipts and expenditures of the American Company under the license contract. He is altogether wrong, not intentionally so I am satisfied, but none the less obviously wrong in his understanding of the evidence on the subject. For one single example, in the New York Telephone case to which he has referred the testimony there on the subject showed that the cost of the services performed by the American Company under the license contract was in excess of the receipts from the associated companies paid to the American Company under the contract.

Mr. Maltby: Don't you think your motion would come better at the termination of the correct examination?

Mr. Shuler: I have no objection to that whatsoever. I am simply protecting myself and the cities of Ohio on the proposition that we have not caught them short. I will make the motion at the close of their case and give them notice now that I am going to make that motion then.

Commissioner Maullar: I think that is better. You withdraw the motion at this time. They have not indicated yet what will be their proof.

And thereupon the further hearing of this matter was adjourned to Monday Afternoon, March 24th, 1924 at one thirty o'clock.

. . . . . .

[fols. 8459-8579] *Monday Afternoon Session*

March 24th, 1924.

And thereupon the further hearing of this matter was resujed pursuant to adjournment.

Present:

Karl E. Burr and Charles S. Maltby, counsel on behalf of the applicant.

John M. Lewis, counsel on behalf of the State Citizens league.

. . . . . .

[fol. 8580] And also WILLIAM T. ANTHONY, called as a witness, on behalf of the Ohio Bell Telephone Company, being first duly sworn, testified as follows:

Examined by Mr. Burr:

Q. Please state your name.

A. William T. Anthony.

Q. Where do you live?

A. Cleveland, Ohio.

Q. What position, if any, do you occupy with the Ohio Bell Telephone Company?

A. I am General Traffic Engineer of the Ohio Bell Telephone Company.

Q. How long have you been connected with that company?

A. Since its formation.

Q. In September, 1921?

A. Yes, sir.

Q. Prior to that time what was your telephone experience, if any?

A. I entered the telephone business in March, 1913 as a student engineer with the central group of Bell telephone companies, with headquarters in Chicago.

Q. Did the central group include Ohio?

A. Yes, sir, the central group included the Chicago Telephone Company, the Michigan Telephone Company, the Wisconsin Telephone Company, the Cleveland Telephone Company and the three divisions of the former central Union Telephone Company.

Q. Including the Ohio Division?

A. Yes, sir, including the Ohio Division. In 1915 I was transferred to the Central Union Telephone Company, with headquarters at Chicago. In 1916 I was promoted to traffic engineer of the Indianapolis division of the Central [fol. 8581] Union Telephone Company. In 1917 I returned to Chicago as traffic engineer of the Central Union Telephone Company, which included in addition to the Indianapolis division, the Ohio division, the Illinois division and the down state Indiana division. In 1920 I was appointed General Traffic Engineer of companies that had formerly composed the Central Union Telephone Company, that is, the Indiana Bell Telephone Company, the Ohio Bell Telephone Company and the Illinois Division of the present Illinois Bell Telephone Company. In 1921 I was appointed General traffic engineer of the Ohio Bell Telephone Company.

Q. What is traffic engineering as applied to the telephone business?

A. Traffic engineering as applied to the telephone business has to do with the providing of methods and equipment for the handling of traffic, that is, local traffic and toll traffic.

Q. What do you mean by "Traffic?"

A. Well, by "traffic," I have in mind handling the calls originated by one subscriber for another subscriber in the same city or for another subscriber in a distant city.

Q. That is, the traffic as represented by your business consists of calls?

A. That is right.

Q. Are you familiar with the services rendered the traffic department of the Ohio Bell Telephone Company by the General Staff of the American Telephone & Telegraph Company?

A. Yes, sir.

Q. Who, if you know, develops the traffic engineering [fol. 8582] practices and the traffic operating methods in use in the territory served by the Ohio Bell Telephone Company?

A. A great many of them, I think most of the practices in use in the territory of the Ohio Bell Telephone Company, were developed by the General Staff of the American Telephone & Telegraph Company.

Mr. Shuler: I move that it be stricken out as too indefinite and uncertain. It doesn't mean a thing.

Commissioner Poor: It may go in for what it is worth. He says a great many and he thinks most of them. A great many is somewhat indefinite.

Mr. Shuler: If they had three and they received two from the A. T. & T., that would be the most.

The Witness: I can enlarge on that a little. In my judgment the American Company has developed over 90 per cent of the traffic engineering practices that I personally use in my business.

Q. Is that Traffic Department of the Ohio Bell Telephone Company organized to do this work for itself?

A. No, sir, we are not organized to do this development work for the reason that it is furnished by the American Company and it would be a duplication of work on our part if we were to organize and endeavor to do it.

Q. In your judgment could your company maintain under any reasonable conditions a traffic department which would be productive of the development of traffic engineering practices heretofore developed by the American Company [fol. 8583] for your company?

Mr. Dotson: We object your Honor. It is purely an opinion and issue cannot be tried upon opinion if this man knows about what the local company is equipped to do and what it is not equipped to do, that is all he can testify to, and then it is for the Commission to determine what services are rendered the Ohio Bell Telephone Company is receiving.

Mr. Burr: To save time the question is withdrawn.

Q. State briefly, if you please, some of the services rendered by the General Staff of the American Company to the Traffic Department of the Ohio Bell Telephone Company which is in your charge?

A. Well, broadly speaking the Traffic Department of the Ohio Bell Company is divided into two branches, the engineering and the operating. The General Staff of the American Company, as I said before, furnishes a great deal of information that the engineering department—traffic engineering I have in mind—that the traffic engineering department of the Ohio Bell uses. The American Company has furnished us with complete information on the type of switchboard, local and toll, that is best adapted for varying conditions. It has also furnished us with the best practices for estimating the amount of equipment required for future periods and for providing the most economical layout of that equipment.

The American Company has also furnished us with practices which we use in connection with our toll line engineering. Those practices are what we consider about the [fol. 8584] best available, and we do all of our toll line engineering on the basis of the practices which have been furnished by the A. T. & T. Company in the form of general engineering circulars and traffic circulars.

Mr. Dotson: How does this differ from the practice of the independent companies?

The Witness: Well, I would say that the practices which the A. T. & T. Company have furnished to us are far su-

perior to the practices used by the independent companies that I have knowledge of. Of course, it is true that the independent companies have adopted a great many of the practices developed by the A. T. and T. Company. We are very glad to furnish those practices to our connecting companies.

Mr. Dotson: In what respect do you mean that it is far superior?

The Witness: I mean the methods which the A. T. & T. have furnished us make for better service.

Mr. Dotson: What are some of the methods you refer to?

The Witness: Well I have in mind operating practices. I have in mind engineering practices.

Mr. Dotson: In what respect have you in mind these certain things now?

The Witness: Well, as an example, when we took over the Ohio State Company, when the Ohio State Company was merged with the Ohio Bell Company——

Mr. Burr: The Ohio State Company being an independent [fol. 8585] company?

The Witness: Being an independent company up to that time we had occasion to review the methods which they used. We had occasion to review the results of the application of those methods, and we found that they had not resulted in the efficiency that would have been realized had methods which we had received from the A. T. & T. Company been used. I have in mind as a specific case the adjustment of the operating force in Cleveland. When we took over the Ohio State organization the operators were provided more or less on the opinion of the chief operator as to the number she required during various hours of the day. Our operating people made a survey of the number of employees on duty in the Cleveland offices.

Mr. Burr: Operators now, do you mean?

The Witness: Operators at various hours of the day, and found that the operators were not distributed in accordance with the requirements of the traffic, and I cannot quote the exact reduction that we made in the force, but it was material. I would say it was over 25 per cent.

Mr. Shuler: Don't you know as a matter of fact that the Ohio State phone service was more prompt in Cleveland than the Bell was?

The Witness: No, I don't know that.

Mr. Shuler: You don't know that?

The Witness: No.

Mr. Dotson: If it was more prompt, then you would regard the system you introduced as more efficient than the [fol. 8586] Ohio State?

The Witness: Well, as I say I don't know that it was more prompt. I doubt very much if it was, for the reason that they did not have enough operators on at certain hours of the day.

Mr. Dotson: Would you regard the judgment of the users of the phones on service as of any value at all as to efficiency of service?

The Witness: Why that depends upon how much the public wants to pay for prompt service.

Mr. Dotson: No, I mean what kind of service they regard as prompt.

The Witness: I feel this way—in fact I am quite sure that the people in Cleveland regard the service given by the Ohio Bell now and at the time we took over the Ohio State property as prompt service.

Mr. Dotson: The point I had in my question was that if the service of the Ohio State prior to merger or prior to the introduction of your method of handling the traffic was more prompt than after the introduction of your method, would you regard that as an improvement over the Ohio State method of providing service?

The Witness: I would say this, Mr. Dotson, assuming that the Ohio State was more prompt than ours, I do not think it could have been more prompt to the extent that any company would have been justified in carrying an operating force in excess of 25 per cent of the requirements to give the grade of service given by the Ohio Bell Com- [fol. 8587] pany at that time.

Mr. Dotson: How did your operating cost compare in total after you introduced your system as against the costs of the Ohio State system?

The Witness: Inasmuch as—this case I have in mind—inasmuch as we reduced the operating force 25 per cent, we naturally cut the operating costs proportionately.

Mr. Shuler: But as a matter of fact don't you know, Mr. Anthony, that the truth is that the per station cost of operating in Cleveland was less for the Ohio State than it was for the Ohio Bell?

The Witness: I do not know what the per station cost was in the Ohio State organization.

Mr. Burr: If your Honor please, with all due deference to the gentlemen on the other side and not intending to cut them off from any of their rights, we have borne with this species of guerilla cross examination for quite awhile now, and it seems to me that we will make time if the witness can be allowed to give his examination in chief in an orderly uninterrupted way, with the understanding that he will return or remain for any cross examination that the other gentleman may wish to have.

Mr. Shuler: My objection, if the Commission pleases, and the reason I have interposed my question, it is perfectly patent that the witness is trying to answer questions by Mr. Burr of which he has no knowledge, and that is the only purpose of interjecting at this particular time my [fol. 8588] questions. If the witness will testify to what he knows from observation or experience, I shall not interject any questions, but if the fitness is going to assume to answer questions of which he knows nothing, then I would like to have the record show the question which we interject to prove that the witness does not know.

Commissioner Poor: I have been wondering in my own mind what this record would look like if anybody would start in to read it, whether they could follow it very closely. The Commission has not felt like prescribing any rules or set of procedure in the matter. I have been waiting for some objection to come. We wanted you to have as much opportunity as you could to get something of the facts as you were going along, but on the objection of counsel for the company, we will have to proceed in an orderly manner and let the company put on its testimony, with opportunity for proper cross examination by one or all of you, and get through. Of course, counsel on the other side have a right to enter objections to any question or anything of that kind, but as far as the interjection of questions of cross examination at this time, if it is objectionable to the counsel for the company, the objection will be sustained.

Mr. Burr: My making the suggestion on that was prompted largely by my conversation with Mr. Shuler during the noon hour. I have rather felt we would have his moral support in raising the point at this time.

Mr. Dotson: Your Honor there is this side to this situa- [fol. 8589] tion that is quite serious to the interests that we men represent. We have an opportunity here by interjecting questions to cover a point that is fresh before all

of us, and I think it saves a great deal of time of the Commission and ourselves in bringing out and meeting properly and more effectively this testimony than any other way. All we are after is not a rigid cross examination regardless of investigation, but to get at the facts. For that reason we have taken liberties in an informal way to interject questions, as long as it is an investigation.

By Mr. Burr:

Q. Mr. Anthony, at the time of the late digression you had touched upon the matter of toll line engineering in response to a question in which you were asked to state briefly some of the services rendered by the General Staff of the American Company to the Traffic Department of the Ohio Bell Company. Will you please give the Commission some of the other services of that character?

A. The General Staff has also furnished information as to the best practices in connection with engineering training school equipment, that being equipment required to train our operators before they are placed at the commercial switchboard.

Mr. Dotson: Now, your Honor, let us have this understanding then in view of the course we are going to pursue. The witness has the responsibility here in the way of stating his knowledge it seems to me, and the witness probably should be advised on that. He says the company has furnished the best method for this, the best method for that. That is purely an opinion on his part. Maybe it is the best thing and maybe it is only better than the others know, [fol. 8590] and maybe it isn't any better than anybody else has, and it is giving a quality to this work that it properly does not possess, or may not possess. Maybe they have rendered service and maybe they have not. They have done certain things, but have they rendered any service of any value? That is the question for the Commission ultimately to determine, whether they have rendered any service of value? It is not for the witness to state whether it has been of any value, but to state what the service is, and then it is for the Commission to determine whether that was of any value which would justify a four and one-half per cent return of gross receipts. That is my analysis of it. I am admitting and conceding that the witness is proceeding in a way that he believes absolutely honest and

fair, but the Commission can see and we can all see that that is an improper way of stating it, and the witness, I think, ought to be advised as to making statements along that line, that that is not for the witness to say.

Mr. Burr: Let it be understood that wherever the witness has used the term "best" or some other superlative characterizing the services rendered, he is stating that merely upon his own judgment, and that the same thing will apply if he inadvertently or purposely uses the word "best" or any similar adjective in his subsequent answers.

Mr. Dotson: And that language is not to be regarded by the Commission as having any bearing at all on the quality [fol. 8591] or character of the work.

Mr. Burr: Except in so far as it reflects the judgment of the witness.

Commissioner Poor: Of course, he has qualified here as an expert traffic engineer and he may give certain opinions in regard to that, and the Commission may give that opinion what weight it sees fit.

Mr. Hagelbarger: It occurs to me if the witness is such an adept on deciding which is the best of these plans, the Ohio Bell needed very little assistance from the A. T. & T. Company, because if he knew, then he did not need to be told by the A. T. & T. Company about which was the best plan as to how to do these things.

The Witness: The General Staff has also furnished information and detailed practices regarding the estimating of ultimate building requirements. They have also furnished information regarding economical layouts of initial and ultimate buildings. We have also received from the American Company circulars covering the engineering of private branch exchange equipment. The practices which have been furnished are based upon the development of those boards which was also made by the A. T. & T. Company. We are also using in Ohio local and toll service observing boards, which were developed by the American Company, and the American Company has furnished us with detailed plans regarding the engineering of those boards. The American Company has also furnished us with information and detailed practices regarding the engineering of equipment in addition to switchboard equip- [fol. 8592] ment that is necessary in performing the functions of the Traffic Department, such as chief operators'

desks, information desks, multiple marking desks and other miscellaneous equipment.

In connection with the engineering of the equipment referred to above, it is necessary, of course, to have considerable data as regards past performance available to project our requirements into the future.

The American Company has developed methods which the Ohio Bell Company uses in connection with the taking of peg counts for various classes of local and toll calls, and for the summarization of those peg counts, so that they may be conveniently used by the Traffic engineers and also by the operating people in connection with projecting force requirements into the future.

The American Company has also furnished us with detailed information in connection with preparing traffic estimates for exchange fundamental plans, which are usually made for a period of 15 to 20 years in the future; also for toll fundamental plans, which are as a rule made for a 15 or 20 year period.

I think in your question, Mr. Burr, you asked me to confine myself to engineering practices.

Q. Oh no, I want the operating practices, local and toll?

A. The operating department is divided into two units, local and toll. The American Company has furnished information to both of those departments. Some of the information furnished was methods to improve the efficiency of local operating room management, which takes into con- [fol. 8593] sideration improvement in service and reduction in operating costs, local operating practices and instructions, which include practices as regards the handling of all types of local and toll calls. The American Company has also gotten out circulars that include detailed operating instructions, which are in such shape that we can place them in effect with practically no labor on our part.

The American Company has also furnished very valuable information as regards the adjustment of our operating forces, methods to improve switchboard loads, the training of operators and supervisors, the taking of local and toll service observations.

All of the items mentioned above and which are only part of the services furnished by the American Company, have to do with both local and toll service. I might cite a case that is special to toll operating. The American Company

during the past year and a half has organized classes for training associate company men in toll operating. In fact, after a man has completed that course, he is a toll specialist, and of a great deal more value to the company and to the public than before he had such training. These classes are held in various cities throughout the country. We have had two in Cleveland. The course lasts, I think, six weeks, and each day a different pole specialist from the American Company's office in New York visits this class and instructs the class in the items of toll operating that this man is particularly proficient in.

Q. Have you received all of the traffic circulars issued [fol. 8594] by the American Company so far as you know?

A. Yes, so far as I know we have received every traffic circular issued by the American Company.

Q. In the testimony of Mr. Archibald Allen recently given in this case there appear a few typical circulars issued by the General Staff, namely, general engineering circular 1,200, traffic circulars Numbers 117, 166, 174, 175, 176, 177, 178, and 200. Have you received those circulars?

A. Yes sir, we have received copies of all those circulars.

Q. In what way does the general engineering circular Number 1200 help you to solve the traffic engineering problems of the Ohio Bell Telephone Company?

A. General engineering circular Number 1200 is very valuable to the traffic engineers of the Ohio Bell Company, for the reason that it covers in detail practically all of the practices necessary in connection with the engineering of local and toll switchboard equipment, including the proper type of equipment to provide and the method of estimating future requirements. I might say that I think practically every man in my organization has a copy of this circular on his desk all the time. It is used every day by practically every man.

Q. Explain briefly the value to the Ohio Bell Telephone Company of traffic circular No. 117 issued by the American Company?

A. Traffic circular 117 covers the methods of estimating future requirements of operators for the purpose of training. It also covers the method of projecting the traffic into the future, so that the operator requirements can be determined, and it provides a means of adjusting the operat- [fol. 8595] ing force to the traffic during each half hour of

the day, so that there — always enough operators for the traffic and yet not an excessive number.

Q. Do you know of any of the circulars issued by the General Staff to your department which are not of material value to your company in engineering and operating its plant.

Mr. Dotson: I object.

(Question read.)

Commissioner Poor: Do you object to the word "material" in there?

Mr. Dotson: Well, that is the principal one.

Commissioner Poor: Elim-ate the word "material" and he may answer the question.

(Question read as amended.)

Mr. Dotson: I still object.

Commissioner Poor: Objection overruled.

Mr. Dotson: Note an exception.

The Witness: No, sir.

Q. Do you know of any of the circulars which are not or have not been used by your company?

A. No, sir.

Q. Have you available at this time any typical traffic circulars in addition to those submitted by Mr. Allen?

A. Yes, sir.

Q. And by traffic circulars I mean circulars received from the American Company?

A. Yes, sir, I have traffic circular No. 133, which was issued by the American Company and is entitled "Notes on local training department equipment and arrangement of building space."

[fol. 8596] Mr. Burr: It may be marked for identification Anthony Exhibit No. 1, and it is offered in evidence.

And thereupon the circular above referred to was marked for the purposes of identification and was offered and admitted in evidence on behalf of the Ohio Bell Telephone Company, and is herewith submitted, marked Anthony Exhibit No. 1, and made a part hereof.

Q. It consists of approximately 50 pages, and I will ask you whether or not you and your company have had any occasion to use this circular No. 133?

A. Yes, we have used this circular in connection with the engineering of the training schools that we have in our various local exchanges. This circular covers the complete layout of an operators' training school, including practice switchboards at which our students are trained before being placed at the commercial switchboard. It covers a calling desk for the use of instructors in originating the calls, practice calls; it covers what we call a multiple practice board, which is used in giving the students training in making connections to subscribers' multiple. It covers equipments for the students to listen in on experienced operators, demonstration equipment for use in the classrooms, and then covers suggestions as to the desirable layout of the training school floor safe, including classrooms and practice rooms and so forth.

Q. Without undertaking to go through all of the circulars [fol. 8597] mentioned by Mr. Allen or all of those that your company has received from the American Company, I am going to ask you whether you have with you any more circulars, and by that I mean traffic circulars furnished your company by the American Company, and being in addition to those referred to in Mr. Allen's testimony.

A. Yes, sir, in addition to those furnished by Mr. Allen and the one I have just placed in evidence, I have one more.

Mr. Burr: That will be sufficient. We do not want to encumber the record too much.

Q. What is the one that you are now referring to?

A. Traffic circular No. 140, which covers central office instruction.

Mr. Burr: It may be marked Anthony Exhibit No. 2, and is offered in evidence.

And thereupon the circular above referred to was marked for the purposes of identification and was offered and admitted in evidence on behalf of the Ohio Bell Telephone Company, and is herewith submitted, marked Anthony Exhibit No. 2, and made a part hereof.

Q. Briefly what subjects does it cover?

A. This circular covers methods of ascertaining the proficiency of operators after they are placed at the commercial switchboard, and makes reference to equipment used in that connection and which is covered in another circular.

[fol. 8598] The point of this circular is this, that while we give our operators a very thorough training in our school, before being placed at the commercial switchboard, we feel that we go a little further than that and give some of the operators a little more training after they have had some experience at the commercial switchboard, and this bulletin provides a means of finding out which operators require that instruction, and also the method of taking up with the individual operators the points on which we have found them to be deficient.

Q. What proportion do the circulars covered by your evidence and those by Mr. Allen constitute of the entire number of circulars furnished by the American Company to your company, if you know?

A. I would say less than five per cent. Mr. Allen put in eight, and I have just put in two. That is ten. And we have received from the A. T. & T. Company over 200 traffic circulars that have been furnished, and then a great many circular letters to which numbers have not been assigned.

Q. In addition to furnishing the Ohio Bell with information regarding the engineering and operating developments as covered in the traffic circulars which we have been discussing, does the General Staff assist the Traffic Department of the Ohio Bell Telephone Company in solving specific traffic problems?

A. Yes, sir. We quite frequently call upon the engineers of the General Staff to assist us in solving some of our specific problems, for the reason that they may have under way developments that will be of value in the work that we have in mind; also they keep us in close touch with the [fol. 8599] developments in other associated companies and their experience in the work those companies have done or are doing is of value to us in connection with our specific problem.

Q. Do representatives of the General Staff come to Ohio to consult with and assist you in your work for the Ohio Bell Company?

Mr. Dotson: I object. I do not think that that is the question. I will object to that.

The Witness: Yes, sir.

Mr. Dotson: Have they come here?

Mr. Burr: Have they come within the past three years?

The Witness: Yes, sir, very many of them. I have in mind a case this week where Mr. S. H. Brown, who is special problems engineer of the A. T. & T. Company, and Mr. Baker, his assistant, were in Cleveland at our request to assist us in connection with a fundamental plan we are making of our toll plant. They arrived Monday morning and I left Monday evening. I don't know whether they are still in Cleveland or not. But they were to stay until our people had gotten as much information as they needed on that particular point.

Last week Mr. James, Mr. Darrow and Mr. Rappleye, of the American Company, came to Cleveland at my request to discuss with us and assist us in the engineering of a toll tandem board which we have planned for Cleveland, and which we probably will provide at other points in Ohio later on. Mr. Rappleye stayed during the entire week and worked with one of my men on the details of the project we have in mind.

Early this month Mr. Morgareth, of the General Staff [fol. 8600] came to Ohio at our request to assist us in the taking of machine switching service observations, which is a more or less new development. The American Company just a few years ago developed service observing equipment for following a call through an automatic exchange and getting detail information as to the progress of that call, which gives us a picture of the grade of service we are rendering in our automatic office. Mr. Mogareth visited several points in Ohio where we have this equipment and helped train our service observers, and also assisted in the training of a supervisor in my office who will have charge of the technique of that particular work. Mr. Morgareth spent two weeks with us and is coming out again next month at our request.

Early this month Mr. La Chance of the General Staff visited me in connection with some problems we have on the training equipment required in connection with our Youngstown merger. He also visited some of our operating people and made, I think, two trips to Youngstown and actually assisted in the training of the special force, operating force, we will require after we go to full mechanical operation at Youngstown.

Q. Do you remember how long he was here on that?

A. Not exactly. He spent three days with me on one trip

and two on another. I did not go to Youngstown with him and I don't know how long he was in Youngstown on either trip, Mr. Burr.

Mr. Van Hagen visited us in February of this year in connection with our cutover plans at Youngstown. Mr. Van Hagen is the American Company specialist on traffic ma- [fol. 8601] chine switching cutovers, that is, on the traffic end of machine switching cutovers.

Q. What do you mean by cutover?

A. I mean where you are changing your operation from manual to automatic, that requires a great many considerations. A great many new problems arise, and we have not had very much experience in this territory with that sort of thing. Mr. Van Hagen has traveled from coast to coast for the, oh, I think, five years on that particular work and is a specialist in it. Mr. Van Hagen also visited us last fall, spent some years at Youngstown in connection with the same matter, and we have asked him to come out again in April. In December of last year, Mr. Wotring visited me in Cleveland at my request in connection with a short haul toll problem we have in Cleveland. He spent several days with me. He assisted us in solving that particular problem.

In November, 1923, Mr. Raynor, of the General Staff, visited me in connection with certain A, B toll problems we have throughout the state.

In September, 1923, Mr. Darrow of the American Company visited me at my request to assist us in solving some A, B and two number toll problems we have at Youngstown, Cleveland, Akron, Dayton, Canton and several other places.

I have given those cases that I remember of personally, where I personally requested men to come out, and I could cite other cases further back. Of course, we have our operating department, and we have in Cleveland the general supervisor of toll traffic, the general supervisor of local [fol. 8602] traffic, and in our various division headquarters we have our division traffic superintendents. Each one of these men holds conferences about as often as I do with men of the Staff, but I will not try to detail any of those cases.

Q. Have you in mind a few cases where the Ohio Bell Company's engineers have visited the American Company's General Staff in New York in connection with specific problems of the Ohio Bell Company?

A. We do not visit New York as often as the Staff people visit us. They are always glad to come out here and to save us the expense. It also makes it possible for us to get more of our people in on conferences if they come out into our territory. But I have in mind a case last spring where Mr. Blackburn, who is a member of our organization, visited New York and conferred with several men in regard to equipment problems we had at Youngstown and Massillon and Canton and Columbus and other points.

Last July I also visited New York and conferred with several staff men in connection with our unification plans at Columbus, our unification plans at Youngstown, our A, B toll station, and also discussed with me methods of making comparative cost studies on several problems we had under way at the time.

I also visited New York in January of this year in connection with our short haul toll problems at various points and in connection with the Columbus merger.

There are a great many other cases where our people have visited New York, but they have come out here oftener [fol. 8603] than we go down there.

Q. Do you also request assistance from the General Staff by means of correspondence and by telephone where the cases require quicker action?

A. Yes, where a case requires information very quickly we call the Staff men on the telephone. I have in mind a case last fall where I called Mr. Wotring in connection with our Cleveland A, B toll situation.

Q. Whom did you call?

A. Mr. Wotring.

Q. Of the General Staff?

A. Yes, sir, that is W-o-t-ring. I also talked to Mr. Stimsom recently over long distance in connection with handling the coin box service on a machine switching basis. It was something we wanted a quick answer on and he had had experience along that line at other places.

Q. Who is he?

A. Mr. Stimsom is assistant to the local engineer of the General Staff of the American Company. We have any number of conversations, telephone conversations with them. I don't recall any others offhand.

Q. Have you any information regarding the savings made by the Ohio Bell Telephone due to improved engi-

neering and operating methods developed by the General Staff of the American Company and furnished and made available to the Ohio Bell Telephone Company.

Mr. Dotson: Let's have that question.
Mr. Shuler: When?
Mr. Dotson: Yes or no.
The Witness: Yes, I have—
Mr. Dotson: Hold on, that answers the question.

Q. Will you please give the Commission the benefit of [fol. 8604] a few of those savings?

A. Well, I have evaluated a few cases where the Ohio Bell Company has made savings by adopting the practices recommended by the General Staff of the American Company.

Q. Will you give the examples, limiting your answers to the savings for the year, 1923?

A. The first case I have in mind is the adoption of what we call the single ticket toll operating method. That method was developed by the American Company. Prior to the development of the single ticket toll operating method, two tickets were made on each long distance call, one by the toll operator at the originating point and another ticket by the operator at the terminating point. The operator at the terminating point recorded the details of the call placed by the subscriber, that is, the recording operator did that. The call was passed to the line operator at the originating point, and when she reached the distant office, she passed to the inward operator at that office—rather she passed to what we call the ticket operator at that office the details of the call. The distant operator then dealt with the called subscriber, and when she had him at his telephone she reported to the operator at the outward office.

The American Company developed a method which eliminated the writing of the ticket at the distant office, and that method is known as the single ticket toll operating method. With the single ticket method the outward operator deals direct with the called subscriber. The only function performed by the operator at the distant end on those calls [fol. 8605] handled by the single ticket method is to ring the called subscriber.

For the year 1923 the Ohio Bell Company made a saving

of $570,200.00, due to the introduction of the single ticket toll operating method.

Mr. Shuler: May I ask for a statement from him on that point?

Mr. Burr: I am just going to ask him, how was the saving of that amount accomplished?

The Witness: The single ticket method reduced the operating labor by 39 per cent, and, of course, a corresponding reduction in switchboard charged. The single ticket method gave us a reduction of ten per cent, a little better than ten per cent in the way of toll circuit time. The annual savings for the year 1923 for those three items make up this $570,200.00.

Mr. Shuler: Is that for the Ohio Bell toll lines now, Mr. Anthony?

The Witness: Yes, that does not include the traffic handled at any connecting company offices. That is Ohio Bell only.

Mr. Shuler: Will you show me in the two reports of the company for 1922 and 1923 that saving?

The Witness: No, I did not mean to infer that this method is placed in effect on January 1st, 1923. It is——

Mr. Shuler: All right, when was it?

The Witness: It has been put in gradually for the last [fol. 8606] several years. I would say that this method was probably introduced something over seven or eight years ago. I don't know the exact date.

Mr. Shuler: I thought this was done in 1923.

Mr. Burr: No, this was the saving for 1923.

Mr. Shuler: Thank you. That is all I asked him for. He said he couldn't do it because it was for a period of over seven years. Can you give me the statements of your company for the years 1922 and 1923 which shows this saving made in the year 1923?

Mr. Burr: No, Mr. Shuler, you have not got the point at all. It is not a savings over 1922, but it is savings in the year 1923 from that particular method which was used. Now, there was a saving by the application of the same method in the year 1922 and there was one in 1921 and 1920 and so on back to the time when it was first inaugurated, and the witness says that saving has been increased as time has gone on.

Mr. Shuler: All right, if the questions are asked so that I can understand them, that is one thing. But I thought your question was to give the inference that in 1923 due to this thing, that saving was accomplished in 1923.

Mr. Burr: Oh no, I asked him the question I did, that is, asked the question as I did as to 1923, out of deference of what I thought would be the wishes of you gentlemen on the other side, namely, that you would like to have latter day savings rather than more remote ones first.

[fol. 8607] Mr. Shuler: If they were using in 1923 the method used in 1906 they would have saved this $570,000.00.

The Witness: I did not say 1906.

(Previous statement of witness and counsel read.)

Mr. Shuler: As I understood you, you are trying to say that your operating expenses would have been that much more had this single ticket method not been in effect?

The Witness: That is right.

Mr. Burr: I don't think Mr. Shuler's statement is right. It is just the opposite.

Mr. Shuler: They adopted a new method some years ago, some six or seven years ago, Mr. Anthony?

The Witness: Yes, I recall the method being in use to some extent. Let us go back a time when you were using the other——

Mr. Shuler: I don't care when it was. Let's put it 1914. If you were using last year the method you used in 1914 it would have cost you $523,000.00 more to operate——

Mr. McConnaughey: $570,000.00.

The Witness: $570,200.00; that is, if we had been using in 1923 the method we used before the American Company developed this single ticket method the operating expense for the Ohio Bell Company would have been $570,200.00 more than it was actually during the year 1923.

Mr. Shuler: Pardon me this question.

Mr. Burr: We are getting into the bush whacking state again.

Mr. Shuler: No, there is only one on our side you know.

[fol. 8608] Mr. Burr: There are more in evidence.

Q. What will you say as to the saving, if any, due to the introduction of overlap ringing and what is overlap ringing, and how did it come to be adopted by your company?

Mr. Shuler: And when, and then I will not be confused in the answer?

A. The overlap ringing toll method was developed by the American Company in 1922 and adopted by the Ohio Bell Company during the same year. Prior to the introduction of the socalled overlap ringing method the practice was for the operator, toll operator, at the originating point to select the line of the calling subscriber and hold it without ringing. The outward toll operator then rang the distant office and gave the operator at that office the number of the called station. The distant operator rang the called subscriber, and when he answered his telephone and reported that he was ready to talk, the toll operator at the originating end then rang the calling subscriber. The introduction of the overlap ringing method brought about a change whereby both the calling and called subscribers were brought to their telephones, were rung and brought to their telephones at approximately the same time. With this new practice, when the inward operator at the distant point starts to ring, she so advises the outward operator by the phrase, "Ringing". At the same moment the outward operator rings the calling subscriber. Therefore, both subscribers are brought to their telephones at approximately the same time. That saves considerable [fol. 8609] operating in that with the new method the outward operator does not have to wait during the time both subscribers are being brought to the telephone; that is, in the original method she waited first for the called subscriber to report this telephone, and then for the calling subscriber to be brought to his telephone. Now, they are both brought at approximately the same time, making a material saving in operating and circuit usage time. This method reduces the operating expense about ten per cent, a little over ten per cent, and makes a corresponding reduction in switchboard charges and reduces the waste circuit time by something over five per cent. If the Ohio Bell Company had used during 1923 the old method as against the new method developed by the American Company, its operating cost would have been $76,318.00 more than it actually was.

Q. Do you know of any company which had evolved and inaugurated the overlap ringing which you have described prior to the time of its adoption by the Bell System?

Mr. Dotson: I object on the ground that that does not prove anything. A number of others might have had it and he would not know it.

Mr. Burr: He has a right to say whether he knows it or not.

Mr. Dotson: But it doesn't prove anything.

Mr. Burr: It proves whether he knows it.

Mr. Dotson: But nothing as to the issue.

Mr. Burr: Withdraw the question.

Q. Do you know whether or not the Bell System was the [fol. 8610] first to inaugurate and adopt the overlap ringing system which you have described.

Mr. Dotson: I object.

Commissioner Poor: Objection overruled.

Mr. Dotson: Note an exception.

The Witness: So far as I know, and we keep in pretty close touch with the developments made——

Mr. Shuler: Why doesn't he answer the question?

Mr. Gentsch: He can answer that yes or no.

(Question read.)

A. So far as I know the American Company was the first to adopt the method I have just described.

Q. What have you to say as to the single ticket toll method described in one of your previous answers?

A. To the best of my knowledge and belief that method was also first introduced by the American Company.

Q. You are referring to the particular method which you have described in your previous answer?

A. Yes, sir.

Q. What have you to say as to the savings due to machine ringing B boards developed by the American Company through its General Staff and adopted by your company?

A. During the year 1923 the Ohio Bell Company saved $267,300.00, due to operating with machine ringing trunk circuits which were developed by the General Staff of the American Company. I might state that prior to the development of machine ringing trunk circuits, the ringing current was on a key associated with the trunk cord at the trunk position. After making connection to the subscriber's line, it was necessary for the B operator or trunk switch- [fol. 8611] board operator, to press the key and hold it for the length of time which she had to send ringing induction,

over the line. It was necessary for her to press that key each time she had to send ringing induction over the line. With the machine ringing trunk circuit developed by the American Company, the ringing current is on the trunk cord and plugging the plug—this cord into the multiple jack automatically starts ringing and it rings intermittently until the called subscriber answers or until the operator takes down the connection if the call is not completed. The introduction of that method gives us a 25 per cent reduction in B operating labor, and a corresponding reduction in switchboard position requirements.

Q. What do you mean by switchboard position requirements?

A. I have in mind that if a method saves operators it also saves investment in equipment, as you require fewer positions; you cut your equipment in about the same ratio as your operators.

Q. Have you evaluated that savings in equipment in arriving at the $267,300.00?

A. Yes, sir, I have this figure of $267,300.00, which includes the operating saving and includes the savings in charges on switchboard positions but makes allowance for the additional cost of the machine switching cord circuits. They are more expensive than the manual, and the excess annual charges on that additional investment has been deducted from the savings. So this figure I have is net savings.

Q. When you said machine switching cords, you meant [fol. 8612] machine ringing cords?

A. Machine ringing cords, yes, that is right.

Q. What have you to say as to the savings due to the introduction of prepay coin boxes?

A. The introduction of——

Mr. Shuler: May I have an explanation of that, please, this prepay coin box? You mean in public places, Mr. Burr?

Mr. Burr: Yes.

The Witness: Yes, sir.

Mr. Burr: The witness will explain.

The Witness: Prior to the development of the prepay box equipment by the General Staff of the American Company, we had in service what was known as post pay coin boxes. With the post pay method, it was necessary for the operator

to first get the called subscriber to his telephone before the coin was deposited by the calling subscriber. The development of the prepay coin box provided a means for holding in what might be called a neutral zone the coin. The calling subscriber deposits his coin before he gets the operator—depositing the coin brings in a signal at the switchboard. The operator then rings the called subscriber, and if the call is completed, she operates a key associated with the cord which she has used in answering the call, and that deposits the coin in the box. If the call is not completed she operates what we call a return key and that returns the coin to the calling subscriber.

Q. How does the savings result in such case?

A. We reduce our operating labor approximately 50 per cent with the prepay coin box operation, over the old post pay operation.

[fol. 8613] Q. And what does that amount to in dollars saved for the year 1923?

A. I have evaluated the savings for the city of Cleveland only, as I did not have time to get the records for the other points where we have prepay service. The saving during the year 1923 in Cleveland alone was $139,031.00.

Q. What does that make the total savings from those items which you have enumerated?

A. The total savings for the year 1923 for the four items that I have covered was $1,052,932.00. I might say there that in reading my previous figures I rounded off the last two digits, and my total here is based upon carrying the dollars right out. I could just take care of that by putting in the record here the exact figures for each of these items.

Q. Yes.

A. The single ticket method $570,206; machine ringing trunk circuit, $267,377, prepay coin box service $139,031.00; overlap ringing toll operating method $76,318.00, making a grand total for the four items of $1,052,932.00.

Q. Those savings were all for the year 1923?

A. Yes, just for the one year.

Q. Have you evaluated any other savings resulting from the adoption of developments brought about by the General Staff of the American Company?

A. No, sir. I have evaluated only these four. They are typical. We have others—other cases where other develop-

ments have resulted in savings to the Ohio Bell Company, but I have not attempted to evaluate any others.

Q. Can you name two or three of them?

A. The American Company developed what we know as the Number 1-C subscribers' switchboard. That switch- [fol. 8614] board is arranged for automatic listening, automatic ringing, audible ringing signal. We are using that switchboard in several of our exchanges in Ohio, and the use of that equipment has resulted in a reduction in our expenses. The American Company also developed what we know as the A, B toll operating method. That is a method where, instead of connecting a subscriber with a long distance operator, the A operator, the subscriber's own operator, handles his call to certain nearby points. We are using that method in Ohio and that has resulted in savings to the company.

The American Company also developed what is known as the two number toll operating methods. By that method the A operator, instead of connecting the calling subscriber with the long distance recording operator, passes the number to a two number toll operator. The subscriber remains at his telephone. He does not hang up until the two number toll operator has completed the connection. That reduces operating labor and, of course, means a reduction in expenses to the company.

The American Company have developed many other practices that have resulted in savings to the Ohio Bell Company, such as improved local central office management, improved toll central office management. This bulletin I mentioned on force adjustment, I think if we could evaluate that particular bulletin, we would get a tremendous saving. I can enumerate any number of cases. I do not know how far you want [fol. 8615] me to go with that, Mr. Burr.

Q. Well, enumerate one or two more.

A. The American Company has developed practices for the engineering of local and toll central office equipment and toll line engineering, which we are using, and which have resulted in economical additions to the plant, thereby reducing the annual charges on our investment. The American Company has also developed a great many methods or practices used in local and toll operating in addition to those I have evaluated that have actually reduced the operating labor, thereby reducing expenses.

Q. We won't take up any more time with those. Let me ask you, however, whether you or your company in so far as you know have ever requested assistance of the American Company's General Staff and the assistance has been refused?

A. To my knowledge no member of the Ohio Bell Telephone Company has ever been refused assistance. I know that I never have been. In fact the engineers of the American Company are glad to assist us at all times.

Mr. Dotson: May I ask one question?

Mr. Burr: Yes.

Mr. Dotson: I just want to ask the witness if the valuation which he places upon the services mentioned as rendered by the General Staff of the A. T. & T. Company is based entirely upon saving the cost of operation and of capital investment only?

The Witness: I just don't get your question, Mr. Dotson.

[fol. 8616] Mr. Dotson: Just read it.

(Question read.)

The Witness: Yes, I have not included any other savings in those figures.

Mr. Dotson: Then you do not take into consideration the element or factor relating to the question of improved service or more efficient service to the subscriber?

The Witness: Oh, I might say that each one of these items that I have referred to, in addition to reducing the operating expenses there has been a material improvement in service. For instance, with the single ticket method we speed up our service. We eliminate that work at the distant office, have only one operator dealing with the called subscriber and get a call through faster. I might have included something in addition to what I did because undoubtedly—in fact I know that that method has increased our revenue, that is to say, fast service decreases your lost calls, thereby increasing your revenue.

On the machine ringing trunks, that, of course, is at least as good service. I don't know that you would say that was particularly an improvement in service. It is as good as manual ringing. On the overlap ringing method, that, too, speeds up the service. We get our subscribers actually talking at a shorter interval than the old method, and the prepay

coin box service is certainly as satisfactory to the subscriber as the other.

Mr. Shuler: I lose too many nickels by it.

[fol. 8617] Q. With reference to the traffic engineering practices referred to in one of your previous answers, and particularly your reference to local switchboards and toll switchboards, give the Commission some idea, if you please, of the switchboard operation which is covered by those practices. I know that this Commission is fairly familiar with the operation of a switchboard, but for the benefit of the record will you show how these practices which you speak of apply to the switchboard operation?

A. Well, they start out with. "We want a new exchange at some point in Ohio." The first thing to determine is, of course, what sort of a city that is going to be twenty years from now, in order to determine the type of switchboard to provide, that is, so that we can provide the switchboard initially that will take care of our requirements for a number of years without replacement.

The American Company have provided us with methods of determining our requirements for 15 and 20 years hence. I think I referred to that in the exchange fundamental plan item.

Knowing the size of the exchange, we are then in a position to select the type of switchboard. Now, the American Company have covered in general engineering circular No. 1,200 all types of manual switchboards. I might say that in addition to 1,200, they have issued circulars covering all types of machine switching equipment. 1200 covers all types of manual switchboards, together with indications as to where, under what conditions, they can be justified. That is based upon a number of years' experience on the part of the Amer-[fol. 8618] ican Company in their dealings with associated companies.

Having decided the type of switchboard, we then have quite a problem to lay that equipment out economically. I have in mind what we call the face equipment, that is, subscribers' answering jacks, out trunk multiple, subscribers' multiple and other equipment of that character. There is always the question of whether we should, especially in multi-office cities, put subscribers' multiple in the A switchboard or whether we should limit the subscribers' multiple to the trunk switchboard having the A operator trunk all

calls. There are cases where it is not economical to run the subscribers' lines through the entire A board, especially in a large multi-office city where the A operator completes a relatively small percentage of the originating calls in her own office. She might trunk 80 per cent of them to other offices and the multiple which we install in the 8 switchboards and which, of course, cost money would be used for only 20 per cent of the traffic.

Q. Isn't it true that the use of that method depends in every case upon whether or not it will prove in in that particular exchange?

A. Oh yes. It is all a question of the conditions surrounding the particular exchange which you have in mind. The American Company have provided methods of determining the economy of that particular thing under varying conditions. There is always the question of whether we should have more than one appearance of our answering jacks, what is known as multiple answering jacks. That is a question of cost. In some cases we can justify one thing and in some [fol. 8619] cases the conditions demand another.

The American Company have, through their time studies the various intervals required in completing calls and in connection with team work and so forth, determined under what conditions multiple answering jacks will prove in. That information is also covered in general engineering circular No. 1200.

Then there is the question of how much subscribers' multiple shall be installed in the switchboard ultimately and initially. We might find, for instance, that initially we would have enough space in our switchboard for say 9,600 subscribers' multiple and have all of the out trunks we needed. By out trunks I have in mind trunks to other central offices. However, looking forward a number of years, our trunking might be increased to a point where we would have to remove part of the 9,600 and go to the expense of raising the subscribers' multiple sufficiently high in the Board to get in enough jacks for the trunking experience for that future period.

Q. What do you mean by multiple? What is it briefly?

A. By subscribers' multiple I mean the jacks in the switchboard to which the subscribers' lines are connected and in which the A operator answers the calling cord of her cord pair to complete the connection.

Q. Those jacks are arranged in panels, are they not?

A. Yes, sir.

Q. Those panels are in front of the operator?

A. Yes, sir.

[fol. 8620] Q. When you repeat in a second panel the same numbers as are contained in the first panel, that constitutes a multiple, does it not?

A. That is right.

Q. And you multiple that accordingly as it is economical or not to do so?

A. Yes, sir. The American Company have provided us with information which gives us a basis for determining what space should be allowed in our switchboard for our ultimate requirements so as to avoid false work in later years. Now, our toll switchboard engineering, we have several types of toll switchboards. We have several different toll operating methods, all of which require their own type of switchboard. First, we have what is known as the recording board, that is, the board to which the subscriber is connected when he calls for long distance. That board is arranged with what are known as recording answering jacks, which are the termination of jacks located in the A operator's switchboard, and to which she connects her calling cord to connect the subscriber.

Q. What is training school equipment?

A. Training school equipment is equipment particularly designed for the purpose of training students to become operators.

Q. Why is it necessary to make any study of the kind of equipment to use in the training school?

A. It is necessary to make a pretty thorough study of the equipment required in a training school, as the conditions for various exchanges are different. For instance, in Cleveland, we have classes of service that we do not have in some of our other cities, and we put in special equipment for that purpose.

[fol. 8621] Q. Who evolves that special equipment?

A. The A. T. & T. Company have developed equipment for all classes of training.

Q. When you speak of equipment you mean a switchboard, that is, a dummy switchboard?

A. I mean several types of equipment. We have what we call a practice switchboard. It is not desirable to take

a student and put her right at the commercial switchboard, in other words, inflict her upon the public. So that we install what we call a practice switchboard, and except that it is much cheaper than the commercial equipment, it looks just like it. Our instructions originate what might be called fake calls. The operator handles them, as she has been instructed prior to being placed at this practice board. By several hours of actual practice each day the student becomes quite proficient, and when she is placed at the commercial board she is able to handle a certain amount of traffic accurately. Of course, she requires special training over the next several months.

Q. What I had more special reference to was the respects in which the services of the General Staff of the American Company are valuable to you in the matter of engineering your training school equipment?

A. Well, I might state a specific case. About two years ago it was necessary for us to relocate our Cleveland training department. We have a very large training department in Cleveland. It was located in the old Arcade, and we wanted to move it to the Electric Building. Now, the A. T. & T. Company during the last several years have made some very valuable improvements in local training [fol. 8622] school equipment, and we wanted to take advantage of those when we reinstalled this Cleveland Board. So instead of one of our engineers traveling all over the country to find out what other companies were doing in connection with training school equipment, and probably having our equipment engineers spend several months to determine——

Mr. Shuler: What did he do?

The Witness: He took this circular which I have exhibited today and found all of the information that was necessary to engineer this Cleveland training school equipment. It saved our company a lot of money.

Q. How do the services of the General Staff assist you in the matter of operating practices as applied to traffic management and force adjustment and matters of that kind?

A. The handling of telephone traffic, of course, is very complicated and it — necessary that we have definite and uniform instructions for all of our operators. With

anything as technical as local and toll traffic, it, of course, is necessary to eliminate the judgment factor on the part of our operators to a very large extent. Now, the American Company have developed detailed operating practices and instructions by which our chief operators, our supervisors and our operators are trained. If that information were not available it would be necessary for the Ohio Bell Company to maintain a large organization, a large staff organization, on methods work, and probably get around to the various companies and find out what they were doing, so that we could always have the advantage of the thinking powers of the entire telephone system. Instead [fol. 8623] of that, our operating people take the operating practices and instructions developed and issued by the A. T. & T. Company and place them in effect in Ohio.

Q. To what extent has the American Company been of assistance to you and your company in the matter of recording results of operation? You spoke of peg counts a moment ago. What is a peg count?

A. The olden peg count term comes from the practice in the olden days where a peg was moved from hole to hole as operators completed calls. Now, of course, we have more up-to-date methods of counting our calls. We count our calls by means of electrically operated registers. But what a peg count means to us is a record of the telephone traffic in terms of calls that are handled by our operating forces.

Q. To what extent has the American Company been of benefit to you in handling the matter?

A. The American Company has developed the peg count practices which we are using in Ohio.

Q. Briefly, how is the American Company of any service to you and your company in the matter of information desks, chief operators' desks and multiple marking desks? You referred to those in your earlier testimony.

Mr. Dotson: I want to object to that question. I should have objected to the previous one, on the same basis.

(Question read.)

Mr. Dotson: I object to the word "service".

Mr. Burr: Take the question out.

Q. To what extent, if any, has the American Company

[fol. 8624] made any suggestions to your company, and which you have adopted, with reference to information desks, multiple marking desks and chief operators' desks?

A. The American Company has developed chief operators' desks, information desks, multiple marking desks and other types of desks and has furnished information regard- the design and operation of these desks to the Ohio Company.

Q. How do those desks differ from any ordinary desk?

A. Oh, those desks might be termed small switchboards. They have various kinds of jack equipment and cord equipment and key equipment necessary to handle the traffic that comes to them.

Q. Is the information desk the one which is occupied by the information operator?

A. Yes, sir.

Q. What is the multiple marking desk and what is its purpose?

A. The purpose of the multiple marking desk is to handle changed numbers. For instance, if a subscriber gives up his telephone service, his name continues in the directory until a new issue comes out and the public is calling for that number.

Q. What is the equipment on that desk or about it?

A. The equipment on that desk is a number of jacks and keys, with private trunks from all of our A positions and B positions to this desk. Those trunks terminate in either cords in plugs or in keys. We have different types. That provides a means for the multiple marking operator——

Q. What does the multiple marking operator do in brief?

A. The multiple marking operator upon answering a [fol. 8625] call gets the number of the called station and refers to the records, which we keep up to date, indicating the status of each line in the office, both working lines and lines that have been discontinued or the number changed or some other change in the status. She has a complete record of every multiple part in the office and by means of that record she advises the calling subscriber as to the status.

Q. Are all calls involving that sort of numbers switched to the multiple marking desk?

A. Practically all of them.

Q. Now, finally, what is a service observing board?

A. The service observing board is a switchboard where we observe the grade of service rendered our subscribers. We provide in that board equipment for connecting two scattered lines throughout the office and providing means for the observer to follow the program of each call, originating from a line under observation, getting detailed knowledge of the efficiency with which the call is handled.

Mr. Burr: That is all for Mr. Anthony at this time; unless the gentlemen on the other side would like to have him remain for cross-examination tomorrow, we would be glad to have him dismissed with the understanding that he will return at your call.

Mr. Shuler: I would like to have Mr. Anthony furnish me certain information. Now, I can tell him now or I will tell him tomorrow.

Mr. Burr: Ask for it now and then he can be released for the time being.

Mr. Shuler: Mr. Anthony you certainly made your esti- [fol. 8626] mates of saving from data?

The Witness: Yes, sir, from the records.

Mr. Shuler: I would like to have the data showing the savings on the overlap ringing, I mean supporting data. I want to see your figures, how you arrive at it. On the operating machine ringing trunk circuits, on the coin box matter and the single ticket system. Now, that is all. Then I would like to know when the overlap ringing was instituted.

The Witness: That was 1923.

Mr. Shuler: When the ringing trunk circuit was adopted when the coin box was adopted, and the single ticket system. He said these were adopted some time ago.

Mr. Dotson: I would like to have that same information, since you are getting it for him.

The Witness: All right.

Mr. McConnaughey: Make a copy of it for all of us.

Mr. Shuler: Then I would like to know the number of operators in the year 1922 working on the coin box matter and the number working in 1923.

The Witness: Just on that point, Mr. Shuler——

Mr. Shuler: There is the only place you can show me a saving. If you have a saving, you have less operators on the job or the same number handling more messages. I don't care in which way you hand it to me, whether in the

less operators handling the call or the same number of operators handling more calls.

The Witness: I was just going to suggest in this connection that we mix to a certain extent the classes of [fol. 8627] service, that is, we have fractions of operators on one of those classes or the other. But I can give you supporting data on all of those.

Mr. Dotson: I want to state with reference to Mr. Schneider's testimony, we expect to request tomorrow similar data from him. We are not prepared to make known yet our request, and I could not do it before he left the stand today.

And thereupon the further hearing of this matter was adjourned to ten o'clock, Thursday Morning, March 27th, 1924.

[fol. 8628] Thursday Morning

March 27, 1924.

And thereupon the further hearing of this matter was resumed pursuant to adjournment.

Present:

Same counsel as at the previous session.

And also BENJMIN T. MCBURNEY, called as a witness, being first duly sworn, testified as follows:

Examined by Mr. Burr:

Q. Will you state your name and address?

A. Benjamin T. McBurney, 225 East Fourth Street, Cincinnati, Ohio.

Q. What is your business, Mr. McBurney?

A. Telephone business.

Q. With what company are you associated and in what capacity?

A. I am associated with the Cincinnati and Suburban Bell Telephone Company; my present position is vice president and assistant general manager.

Q. How long have you been connected with that company and in what capacities?

A. I have been connected with the Cincinnati Company since September, 1922, and I have been successively as-

sistant auditor, auditor, assistant general manager and [fol. 8629] am now vice president and assistant general manager and also a member of the Board of Directors.

Q. Where does that company operate?

A. It operates in Cincinnati and Norwood, Ohio, Covington and Newport, Kentucky, and approximately a radium of 50 miles of Cincinnati.

Q. Approximately how many stations has your company in service at this time?

A. I can give you that figure exactly. As of February 29th, 1924, 142,948.

Q. Does the American Telephone and Telegraph Company own a controlling interest in your company?

A. No, sir.

Q. Has it ever owned a controlling interest either directly or indirectly in your company?

A. No, sir.

Q. Is the American Telephone and Telegraph Company a stockholder in your company, and if so, what percentage of the total capital stock of the company does it own?

A. The American Company owns a minority interest, something under 30 per cent.

Q. Is the remainder of the stock in your company actually owned in good faith by persons who are entirely independent of the American Telephone and Telegraph Company?

A. Yes, sir, the controlling interest in the Cincinnati Company is owned by Mr. Kilgore and his associates, practically locally owned. I think 68 per cent of the stock of the Cincinnati Company is owned in the territory of the Cincinnati Company.

Q. How many directors has your company?

A. Eight.

[fol. 8630] Q. How many, if any, of these directors are associated with the American Telephone and Telegraph Company?

A. Only one, Mr. H. B. Thayer.

Q. Has the American Company ever been represented on the Board of your company by more than one director?

A. No, sir, only one director.

Q. Has your company an Executive Committee, and, if so, of how many members does it consist?

A. The president of the company, the company has an

Executive Committee, consisting of the president, or vice-president and four directors.

Q. Tell the Commission whether any member of the Executive Committee is connected with the American Telephone and Telegraph Company?

A. No, sir.

Q. Have any of the members of the Executive Committee of your company ever been connected with the American Telephone and Telegraph Company?

A. No, sir.

Q. To what extent have the affairs of your company been controlled by its own Board of Directors and Executive Committee?

Mr. Shuler: I object to the question.

Commissioner Poor: What is the purpose of that, Mr. Burr?

Mr. Burr: To show that the company operates, so to speak, on its own bottom and independently of any companies.

Mr. Shuler: How would this witness know, anyhow?

Mr. Dotson: Control is a relative question. It might be [fol. 8631] controlled by one man although there might be eight on the Board. One man might run it.

Mr. Gentsch: The assumption is that they do, the presumption is that they do.

Commissioner Poor: I think that speaks for itself on showing the personnel of the Executive Committee and Board of Directors. The objection is sustained.

Mr. Burr: Note an exception.

Q. By what Board or Committee are the affairs of your company controlled?

Mr. Shuler: I object to the question.

Commissioner Poor: The objection is overruled.

Mr. Shuler: Why, how can you prove by this witness that fact? The regulations and bylaws of the company are the evidence of that.

Commissioner Poor: This witness may know it.

Mr. Shuler: Do you allow secondary evidence to go in without primary evidence?

Commissioner Poor: This witness may know it.

The Witness: By the Executive Committee of the Cincinnati Company.

Mr. Shuler: Of course that is absolutely contrary to the law of Ohio.

Q. What has the Board of Directors to do with the management of your particular company, and when I say "board of Directors" I mean your Board?

Mr. Shuler: I object to the question.

[fol. 8632] And thereupon the Commission overruled the above objection, to which ruling of the Commission counsel for the cities excepted.

A. The Board of Directors of the Cincinnati Company absolutely control the operations and policies of the Cincinnati Company.

Q. To what extent, if any, have the representatives of the American Telephone and Telegraph Company or its associated and allied interest participated in the management or direction of the affairs of your company, so far as you know?

A. The representatives of the American Company or its associated allied companies have never actively participated in the management of the Cincinnati Company; in fact, no director, no representative of the American Company as director, has ever attended a director's meeting of the Cincinnati Company with one exception, and that was on the occasion when Mr. H. B. Thayer made a visit to Cincinnati. I think that was in December, 1920, on which occasion he made an inspection of the property and addressed the employees. At the particular meeting that I mention, there was no particular business transacted.

Q. Does your company pay any portion or percentage of its receipts or earnings to the American Telephone and Telegraph Company?

A. The Cincinnati Company pays 4½ per cent of its gross earnings to the American Company under the so-called license contract.

Mr. Hagelbarger: I object to the question. I should have objected earlier. I am asking now if it is understood [fol. 8633] by the Commission and everybody concerned that if one attorney objects, he objects for each and all of

the cities that are represented, and if one excepts the exception is for the benefit of each and all.

Commissioner Poor: That is agreeable to the Commission.

Mr. Burr: We have no objection.

Mr. Hagelbarger: You do not object to that?

Mr. Burr: Oh, no.

Commissioner Poor: The objection is well taken and will be sustained.

Mr. Burr: Do I understand that the Commission will not permit this witness to testify that his company pays for and receives the services under the license contract? The purpose of the testimony of the witness is to show that his company, although an independent company, nevertheless considers the license contract and the services rendered under it of sufficient value to subscriber and pay for this service.

Commissioner Poor: The Commission feels that it is immaterial to the case before us. The Cincinnati and Suburban Bell Company is not a party to the proceeding in any way, and what some other company may say the A. T. & T. or what services some other company may get from the A. T. & T. has no bearing on what services, and the value of them, are rendered to the company under investigation by the Commission.

Mr Burr: The materiality of the testimony is in this, [fol 8634] your Honor. The American Company furnishes the service under the license contract, first to the associated Bell companies, and of course the gentlemen on the other side are questioning the propriety of that payment and the value of the services rendered. Now, here we propose to show is an independent company, which is not controlled by the American Company at all, but which voluntarily purchases the services and pays for them the sum that any associated Bell company pays, and that in our judgment reflects directly upon the value of these services, that is to say, whether or not this contract is justified, because if the contract between the Cincinnati and Suburban Company on the one hand and the American Company on the other is one entered into by the Cincinnati Company without being in any way influenced by the American Company and as an entirely free agent, without any stock ownership or control or anything of that sort, it certainly is the

best evidence that I can think of of the fairness of this contract. I might say further that testimony of this sort has been received and admitted in evidence in many other cases similar to this.

Mr. Dotson: Over objection? Now, Your Honor, it seems to me that the Commission is absolutely right, that it cannot be wrong in this ruling, because it is tantamout to a case of Mr. Burr, for instance, making a contract with one of the attorneys here to render certain services, and he turns around and enters into a similar contract with me to render [fol. 8635] those same services. Now, he gets into a controversy with the other party. He proposes now to prove his case against the other party by proving the kind of contract that he has and the agreeableness of that contract between him and me. Of course that is absolutely foreign. The Commission is absolutely right that it is immaterial. This whole controversy is over the question of the fairness of this charge and the value of the services rendered by the A. T. & T. Company to the associated companies, which it is admitted are owned and controlled body and soul by the A. T. & T. Company. The A. T. & T. Company absolutely holds the whip hand and can control the affairs of the associated companies in every respect, whereas the Cincinnati Company is not, and we will admit that it is perfectly free to make any contract it pleases. But whatever contract it does make with the A. T. & T. Company cannot in any respect reflect any materiality upon the contract that exists between it and the associated companies.

Mr. Burr: Your very argument proves my point, Mr. Dotson. You gentlemen on the other side shout your heads off about the control by the American Company of the Ohio Bell Telephone Company, and you say that one reason why this reason why this contract on its face is unfair, is because it is entered into by a so-called controlled company. And now we come in here and offer evidence of a company which is not controlled, as you concede, not controlled in [fol. 8636] any way, but which considers these services so valuable that voluntarily it avails itself of the benefits of this contract, and pays precisely the same amount in per cent as paid by the Ohio Bell and the other associated companies for these services.

Mr. Dotson: But, Mr. Burr, you started with the assumption and expected the Commission to assume that the con-

tract you have with the Cincinnati Company is identical with this contract that is under investigation.

Mr. Burr: I cannot make my case all at on-e.

Mr. Dotson: And that the services are the same. Yes, but then you can not make, as the Commission says, your case by trying to prove it through some evidence that is wholly irrelevant, which constitutes an entirely different transaction between different parties, and we would have to — here day after day to find out whether they are the same contract, and find if on that basis they could be admitted.

Mr. Burr: I can show you that in two minutes.

Mr. Dotson: No, you can't.

Commissioner Poor: The Commission does not say at this time that Mr. McBurney can not testify as to whether these services performed by the A. T. & T. Company to the Ohio Bell are valuable, but at this time in the investigation before the Commission it is immaterial to show what the services rendered by the A. T. & T. Company to the Cincinnati and Suburban Bell Telephone Company are and their value.

Mr. Burr: I was not attempting to show that.

[fol. 8637] Commissioner Poor: I cannot see the materiality at the present time of showing the value of the services of the A. T. & T. to the Cincinnati and Suburban Bell in a case which involves only Ohio Bell.

Mr. Dotson: Surely if a controversy of this kind arises between the A. T. & T. Company and Toledo Exchange, in trying to check the value of these services to the Toledo Exchange, surely it would not be permitted to show what the value of its services are to Cleveland in order to prove what the value of the services are to Toledo. That is coming nearer home. And yet that would not be consistent.

Commissioner Poor: If Mr. McBurney knows what the services are performed by the A. T. & T. Company for The Ohio Bell and qualifies in regard to that, he may testify as to their value to the Ohio Bell.

Mr. Burr: Note my exception to the Commission's ruling.

Q. Has your company a contract with the American Telephone and Telegraph Company covering services to be rendered by the latter company to your company?

Mr. Dotson: I object.

Mr. Burr: He can answer that by yes or no.

The Witness: Yes.

Mr. Hagelbarger: It is absolutely immaterial. There is no use going into it.

Commissioner Poor: I think it is immaterial.

Mr. Burr: Note an exception.

[fol. 8638] Q. Are you familiar with the services rendered by the American Telephone and Telegraph Company under the so-called license contract with its associated companies?

Mr. Gentsch: I object. That assumes that that contract is all the same and that he knows it is the same.

Mr. Burr: Why don't you let me prove it and then we won't have to assume it.

Mr. Gentsch: You are a pretty good lawyer, Mr. Burr, but I have been sitting here for one day and I have been surprised at some questions, and here is one of them.

Commissioner Poor: The objection to that question is overruled.

The Witness: Will you read the question?

Question read.

The Witness: I am in a general way and I have heard the testimony of the services rendered by the American Telephone and Telegraph Company to its licensed companies in a number of cases.

Q. Do you know how much the Ohio Bell Telephone Company pays to the American Company for its services?

Mr. Hagelbarger: I object.

The Witness: I understand 4½ per cent of its gross earnings.

And thereupon counsel for the cities moved to strike out the above answer.

Commissioner Poor: Do you know? That is the question.

The Witness: I understand so. I could not definitely [fol. 8639] say that I know, that is, I have never seen a check and examined it.

Q. Does your company receive from the American Company similar services to those rendered by the American Company to the Ohio Bell Telephone Company under the license contract between those two companies?

Question objected to by counsel for the cities; question subsequently withdrawn.

Q. Do you know the character of the services furnished by the American Telephone and Telegraph Company to the Ohio Bell Telephone Company under the so-called license contract existing between those two companies?

Mr. Dotson: That can be answered by yes or no.

Mr. Burr: I suppose you will object to that, because you will say there is no contract in evidence.

Mr. Dotson: Assuming the fact.

Mr. Burr: We have been talking about that fact——

Mr. Gentsch: It is assuming that he knows.

Commissioner Poor: The question is, does he know?

Commissioner Maullar: He has already answered that question. He says he only knows from the testimony of other witnesses. It is merely hearsay.

Mr. Shuler: In other cases.

Question read.

Mr. Miller: He was asked that question before and he answered that he knew only from the testimony of other witnesses.

Mr. Burr: No, he did not *any* only from the testimony [fol. 8640] of other witnesses.

Mr. Gentsch: He said he understood. That was his answer.

Commissioner Poor: The objection is overruled.

The Witness: I have read the contract that the Ohio Bell Telephone Company has with the American Company and I assume that the American Company performs the services mentioned under that contract.

Mr. Dotson: We ask that that be stricken out.

Mr. Burr: Yes, his assumption may go out.

Mr. Shuler: That is, the answer to it?

Mr. Burr: No, where he says he assumes.

Mr. Dotson: His answer does not amount to anything if you take out the word "assume" because that is the basis of his answer.

Mr. Burr: Will you listen to his answer? I will have it read.

Question and answer read.

Mr. Dotson: There you are. He assumes it only.

Mr. Burr: He has read the contract.

Mr. Miller: No, that is not responsive.

Commissioner Maullar: As the record stands, he has just read the contract.

Mr. Miller: That is not responsive to the question. The question is what service. He says he has read the contract.

Mr. Dotson: In his own mind he has nothing stronger to assure him of it than an assumption, and we must take [fol. 8641] him at his word on that.

Commissioner Poor: The answer is not responsive.

Mr. Gentsch: I think the answer ought to stay in. Now, somebody is laughing around here. I think I can satisfy everybody I am right.

Mr. Burr: I am not laughing at you, Mr. Gentsch. I think you are right. I am simply laughing at the inconsistency of gentlemen at the table taken as a whole.

Mr. Gentsch: That isn't any different than was shown yesterday, because you ought to have gone out and had a conference with one of your witnesses. This answer should stand because it shows exactly what this man knows and shows conclusively that he is not a competent witness upon the matter which Mr. Burr is trying to bring out. I say that in spite of the fact that I know that the answer is not responsive to the question. The answer does show that he doesn't know anything about it. That is the main thing.

Commissioner Poor: What is there before the Commission? I don't know whether there is a motion to leave the answer in or a motion of the solicitors to strike out the answer as not being responsive.

Mr. McConnaughey: There is a motion to strike the answer out as not responsive to that question.

Commissioner Poor: That will be sustained.

Q. Have you in your possession a copy of a paper writing consisting of a certain number of pages of white paper, on the outside cover of which there is typed in black ink the words, "Agreement between American Telephone and Tele- [fol. 8642] graph Company and the Cincinnati and Suburban Bell Telephone Company, covering telephone services, licenses and privileges"?

A. I have.

Mr. Dotson: Just a moment. I want to object for the reason that the question is double barreled. First it asks whether he has such a thing, a contract in writing between those two, and then he goes on to state to us whether it is a contract covering certain things.

Mr. Burr: I did not ask him any such thing. I asked him whether it showed on a printed page—on the cover of it I should say—a certain legend. That is all.

Question read.

Mr. Dotson: Is that all on there, "Covering telephone services, licenses and privileges"?

Mr. Burr: Yes, but lest that offend you too much——

Mr. Dotson: No, if it is on there, all right.

Mr. Burr: For identification the document, consisting of 13 pages of typewritten matter, is marked McBurney Exhibit No. 1.

Mr. Dotson: Is that in the record?

Mr. Burr: Get that in the record. I want all of this talk in the record, if you please.

And thereupon the paper writing above referred to was marked for the purposes of identification as McBurney Exhibit No. 1.

[fol. 8643] Mr. Burr: We will now proceed to make up our record on this phase of the case. Let the record show that if the following question, "Does your company pay any portion of percentage of its receipts or earnings to the American Telephone and Telegraph Company?" would, if propounded to the witness, be answered, "Yes".

If the following question, "What amount?" were propounded to the witness, the witness would answer as follows, "Our company pays 4½ per cent of its earnings to the American Company under the so-called license contract."

Also the following questions and answers:

"Q. Is a copy of that contract the paper writing which has heretofore been identified by you and marked for identification McBurney Exhibit No. 1?

"A. It is.

"Q. Please state in detail the items of revenue upon which the 4½ per cent payment made by your company to the American Company is based.

"A. The items comprising the payment are the total of the subscribers' station revenues, public pay station revenues, private exchange line revenues and message toll revenues, less uncollectable revenues.

"Q. When the contract marked McBurney Exhibit No. 1 was entered into between your company and the American Telephone and Telegraph Company, was the management

and control of your company's affairs entirely independent of the American Company?

"A. Yes, sir.

"Q. Did the American Company at that time own any more than 30 per cent of the stock of your company?

"A. No, sir.

[fol. 8644] "Q. Was it at that time represented on the Board of your company by more than one director?

"A. No, sir.

"Q. What is your judgment as an officer of the Cincinnati and Suburban Bell Telephone Company and as an experienced telephone man, as to whether or not the use of the property furnished to your company by the American Company and the services furnished in addition to such property under the license contract between the American Company and your company are worth the amount paid therefor by your company as provided in the contract marked McBurney Exhibit No. 1?

"A. I believe that they are worth as much and much more than the amount paid for them by our company.

"Q. What in your judgment is the value to your company of the services furnished under the contract marked McBurney Exhibit No. 1?

"A. In my judgment that contract, which is the so-called license contract between the American Company and our company, is invaluable to our company.

"Q. What are your reasons for that answer?

"A. Because, entirely apart from the question of price, the services rendered under the contract are not obtainable or available to our company from any other source. In a company such as ours, we are not financially able to maintain the personnel necessary to perform the extensive work, including research and experimental work necessary to evolve and develop the new and improved methods and apparatus of the Bell system. Even if the necessary personnel and funds were available, we would not have at our disposal, [fol. 8645] as we now have, the experience, the cumulative experience of all of the Bell companies, and no doubt a great portion of any work done by our company would be merely a duplication of work already done by some other company and as to which we now have the benefit under the contract whenever such work is done. The contract is not only valuable to our company on account of value heretofore received

under it, but as a guarantee or assurance for the future that the Cincinnati Company will enjoy the benefits of future developments in the art of telephony as the development and research work of the American Company progresses.

"Q. Why does the Cincinnati Company continue the arrangement whereby it pays this percentage of certain of its gross receipts to the American Telephone and Telegraph Company under the contract?

"A. Because it desires to continue an arrangement which actual operation has shown to be profitable and generally satisfactory to it, that is to say, to the Cincinnati Company.

"Q. If the Cincinnati Company did not now have the so-called license contract, would you, as an officer of that company, be in favor of negotiating such a contract as is covered by your Exhibit No. 1 with the American Company?

"A. Yes, sir, I certainly would.

"Q. Do you know whether or not the associated Bell Companies pay to the American Company on the same basis as your company pays for the same or similar services [fol. 8646] rendered under the contract?

"A. That is my understanding.

"Q. In brief, what are some of the services performed by the American Company for your company under the contract, McBurney Exhibit No. 1?

"A. The representatives of the general staff of the American Company visit Cincinnati from time to time and almost continuously at our request for consultation and advice on various matters relating to the business of the company. Representatives of our company also go to New York from time to time for conference with the representatives of the general staff. The relationship is a continuing one and there is a constant flow of communication between the two companies by way of correspondence, telephone messages and personal interviews. There are many specific matters of great importance to our company, in which the American Company has been of inestimable value to us during recent years, but it is perhaps sufficient to say that the American Company has never refused our requests for advice and assistance, and in addition to complying with our requests in those respects, *has* frequently and constantly does offer its services and advice and the results of its work to our company.

"Q. In addition to the furnishing of advice and consul-

tation, does the American Company furnish to your company under the contract any instrument service?

"A. Yes, it furnishes us the instrument service, a description of which will be found in the contract marked McBurney Exhibit No. 1.

[fol. 8647] "Q. What are some of the other rights secured to your company by the contract?

"A. The right to use all patents covering the telephone art and secured by the American Company from time to time, with protection and defense against infringement suits; the right to new and improved apparatus and developments in the art of telephony resulting from the research and development work conducted by the American Company; also advice and assistance in general engineering, plant, traffic, operating, commercial, accounting, patent, legal, administrative and other matters connected with the conduct of the telephone business; advice and assistance in financing, although it should be added that the Cincinnati Company has never had occasion to avail itself of the financial service and assistance of the American Company under the contract, having been able up to this time to successfully finance its own requirements.

"Q. Approximately how long has your company had the benefits of the services and property furnished by the American Company under the license contract?

"A. Since the first day of May, 1882, the present contract being the last or latest one between the companies and being the last of a series of contracts between them, covering the subject and dating back as I have said to May first, 1882."

Mr. Burr: You may cross examine.

Mr. Dotson: No cross examination.

Mr. Burr: If there is no cross examination, Mr. Kositzky may be sworn and take the stand.

[fol. 8648] And also G. A. Kositzky, called as a witness, on behalf of the Ohio Bell Telephone Company, being first duly sworn, testified as follows:

Examined by Mr. Burr:

Q. Please state your name.

A. G. A. Kositzky.

Q. What is your position with the Ohio Bell Telephone?

A. Chief engineer.

Q. How long have you occupied that position?

A. Since the formation of the Ohio Bell which I believe was the latter part of 1920.

Q. Prior to that date what, if any, experience have you had in the telephone business?

A. Starting in the year 1905 I entered the employ of the New York and New Jersey Telephone Company.

Q. Before you state that, where did you go to college?

A. I studied engineering and mechanics at the University of Nebraska in the year 1896 to 1901. In the years 1904 and 5, a period of two years, I studied electrical and mechanical engineering at Ithaca, New York. I graduated from this institution in the year 1905, with the degree of mechanical engineer.

Q. Now proceed, if you please.

A. After graduation in 1905, I entered the employ of the New York and New Jersey Telephone Company, headquarters Brooklyn, New York. This was the Long Island Division. My first experience was that of writing specifications, preparing estimates, estimating costs of work, of [fol. 8649] telephone plant work. This position I held for about a year, at which time I was promoted to the office of construction engineer, covering the territory of Brooklyn and the immediate suburbs, or all of Kings County and part of Queens County. This position I held until 1909. During the period while I was in this position as construction engineer, the telephone company experienced a tremendous growth, and practically the entire aerial plant at Brooklyn was rebuilt. A number of new methods were adopted at that time and employed in the rebuilding of the aerial plant, also a great deal of underground work was done, among which was a toll cable, and the first one of its kind, between Brooklyn and Farmingdale, a distance of about 30 miles. This was all underground. In 1909 I was loaned to the Pacific Telephone and Telegraph Company at San Francisco.

Q. Just a moment before you go to that. What do you say was the amount of plant added during the period from 1906 to 1909 while you were in the employ of the New York and New Jersey Telephone Company?

A. They had a very heavy construction program, at least, so considered at that time, and I should estimate around

between fifteen and twenty million dollars gross construction costs.

Q. You had to do with all of that work did you?

A. All of the outside work, yes. In 1909 I was loaned to the Pacific Telephone & Telegraph Company at San Francisco, and had to do not only with their construction work [fol. 8650] but also the reorganization of the plant department, particularly the plant engineering department. I was the division engineer of that company first at San Francisco, then transferred to Los Angeles, Portland, Seattle, Spokane, and had general charge you might say of all the outside construction work during this period. They had quite an extensive program, and it was necessary for them to get outside help, and I was one of the few men that were sent out there to help them.

In 1910 I returned to New York and was engaged in general work, mostly engineering, consulting work, of upstate New York. At that time or just prior to this time, three separate Bell companies outside of New York City, and what we call up-state New York, were amalgamated or consolidated into the New York State Telephone, the Hudson River Company at Albany, the Central New York, with headquarters at Syracuse, and I think the Buffalo Telephone Company, at least, their headquarters were at Buffalo. They had a great deal of work to do besides reorganization work, and I was detailed to help out in that particular program.

In 1911 I was transferred to St. Louis as plant engineer with the Old Bell of Missouri, which was a Bell Company, operating mostly in St. Louis and vicinity.

And the following year I was transferred to Kansas City.

Q. What were your duties before you went to Kansas City with the Bell of Missouri?

A. The duties of a plant engineer. That was my po- [fol. 8651] sition. Not only to supervise engineering of all plant work, but also to have engineering supervision over all construction work. My duties of course were that class of work.

In Kansas City I was promoted to the position of general superintendent of plant for the Missouri and Kansas Company. This company covered the territory of Kansas and a part of Missouri not covered by the Bell of Missouri. I held this position for about five years, until 1917, and during this period I had charge of the engineering work,

construction work, maintenance of the property, and a great deal of valuation work. The commissions in Kansas and Missouri were formed about this time, in 1911 and '12, and of course we were entering into the valuation game and had to do a great deal of inventory work and development of units costs, and we organized systematically to handle this work.

About 1917 the various Bell companies in the southwest, such as the Bell of Missouri and Kansas Company and four or five others were consolidated, if I may use that word, into the Southwestern Bell Telephone Company, which operates in the five states in the southwest, comprising Missouri, Kansas, Oklahoma, Arkansas and Texas.

I was transferred at this time to St. Louis, reporting to the operating vice-president, and had general supervision of plant operations and also inventory and appraisal work.

[fol. 8652] Q. That is covering what states?

A. The five states that I mentioned.

Q. Missouri, Kansas, Oklahoma, Arkansas and Texas?

A. Yes, sir. In the year 19——

Q. Just a moment. What connection if any did you have with the so-called Houston case which has been recently decided by the United States Supreme Court?

A. In the year 1917, when I was transferred to this position, it was for another purpose in addition to supervision of plant operation, that is, to help out in this particular case, which at that time or about that time was started, that is, the Houston case. We inventoried and appraised the property, and for a little over one year, I had charge of the valuation and the expert work. I might say also that in Texas at that time we had the Ft. Worth case, which was heard and decided ahead of the Houston case. The Houston case was prolonged probably largely because of the period of federal control, and I was no longer connected with that company when it was decided.

Q. Are you familiar with the license contract which was in issue in that case?

A. Yes, sir.

Q. Were you familiar with it at that time?

A. Yes.

Q. Are you familiar with the license contract in issue in this case?

A. Yes, sir.

Q. And the services furnished your company under it?

A. Yes, sir.

Q. What will you say as to whether or not the character of the services furnished under the license contract involved [fol. 8653] in the Houston case and in this case were substantially the same?

A. They are the same except——

Mr. Gentsch: I object. It may be that I am out of order, but my understanding of that case was when it was decided that the matter of the 4½ per cent contract just went by default in the evidence. There was no issue raised on that proposition.

Mr. Burr: Quite the contrary. One of the most, if not the most, important issues in the entire case was the propriety of the license contract and the payments made under it.

Mr. Gentsch: As I understand, the city presented no evidence in opposition to that.

Commissioner Poor: The objection will be overruled.

Mr. Gentsch: Note an exception.

The Witness: The payments are substantially the same. The service was the same except of course as they have been improved upon from time to time. We get more services today because of the advance in the art. But generally they have the same call on the A. T. & T. Company as the Ohio Bell Company. I think Mr. McBurney was a witness in that case.

Mr. Gentsch: I ask to have that answer stricken out.

Commissioner Poor: Did you answer?

Mr. Gentsch: Yes.

Mr. Miller: If the Commission please, the decision in [fol. 8654] that case was made on the record in that case, which may be vastly different from the record in this case. The Supreme Court only considered the evidence that was introduced there, and the court said in that case that under the state of the record there was practically no evidence showing the unreasonableness of the contract.

Commissioner Poor: That is this, Mr. Miller. We are not trying that case. We have gone thus far with this witness to find whether he has been familiar with the contract involved in that case.

Mr. Miller: How is that material in this case?

Mr. Burr: We have not at all asked him about the record in that case. I am asking him about a question of facts.

Mr. Gentsch: It goes to the materiality of the question. What relevancy does it have here anyhow, whether he was familiar with it or not? He is trying to make a comparison here. That is the object of the question, and I say that that is utterly incompetent.

Commissioner Poor: The latter part of the answer relative to Mr. McBurney may be stricken out.

Mr. Gentsch: Note an exception.

Q. During the time that you were with the Southwestern Bell Telephone Company, to what extent if any did you inventory and appraise any of the property of that company, and particularly the Missouri and Kansas property?

Mr. Shuler: Is the purpose of this simply to qualify [fol. 8655] him?

Mr. Burr: That is true.

The Witness: I had supervision or direct charge of all the inventorying and appraising all of the Missouri and Kansas property, a great deal of the property in Texas, much of the property in Missouri, the Bell of Missouri, particularly that of St. Louis and considerable in Arkansas.

Q. After your service with the Southwestern Company what did you do?

A. I was then transferred to Chicago and promoted to the position of chief engineer for the Central Union Company. This was in 1919. The Central Union at that time comprised the telephone properties of Illinois, Indiana and Chicago outside of the cities—I mean Ohio, outside of the cities of Chicago, Cincinnati and Cleveland. This position I held until the properties of the Central Union were divided into state organizations and the formation of the Ohio Bell and the amalgamation of the properties in Ohio of the former Cleveland Company, parts of the Chesapeake and Potomac in Ohio, and the Central Union of Ohio, at which time I was transferred to Cleveland, and I have held that position—I am holding that position now.

Q. During all of this experience, how much telephone property have you either appraised or how much of its appraisal have you supervised?

A. Oh, I should say about $100,000,000 of property, telephone property.

Q. How much telephone property have you engineered or constructed or supervised with reference to the engi-
[fol. 8656] neering and construction during that period?

A. That is the entire period of my telephone experience?

Q. Yes.

A. I should say considerably over a hundred million.

Q. I forgot to ask you, did you ever have any experience prior to your telephone experience?

A. What kind of experience? I have had a great deal of experience.

Q. What did you do between the years 1901 and 1904?

A. Most of the time I was engaged in working for a contractor, building contractor in Bismarck, North Dakota, and the rest of the time I was punching cattle.

Q. On a range?

A. My father's range.

Q. Are you a member of any engineering societies?

A. Yes, sir.

Q. What are they?

A. The Cleveland Engineering Society. I am a member of the American Institute of Electrical Engineers.

Q. During your 19 years of experience in the telephone business, have you had anything to do with the engineering work connected with the merger and physical consolidation of telephone properties?

A. Yes, sir.

Q. In general what has been your experience in that line of work?

A. Outside of the state of Ohio I had to do with the merger work in Topeka, Kansas, St. Joseph, Dallas, Texas, Indianapolis, Kansas City—oh, a number of other cities of lesser importance, and we are now engaged in Ohio merging the properties here.

Q. Give some approximation if you please of the size
[fol. 8657] of the job in Ohio.

A. There are 46 points or exchanges at which there was dual service, involving something like three to four hundred thousand stations of both companies, and the work has now been in progress over two years, engineering work is just about completed and the construction work in many places pretty well along, and in others we have of course completed the work. In dollars I should say it is costing around about twelve or thirteen million dollars.

Q. We have been referring to the consolidation of serv-

ice. I assume you mean the consolidation of the service of the two companies, the two former companies, the Ohio State Telephone Company and the Ohio Bell Telephone Company, which as constituent companies were in September 1921 consolidated into the present Ohio Bell Telephone Company.

A. Yes, sir. We have also at a number of other points in Ohio—the Sandusky Home and the Springfield Xenia properties—consolidated, that work being completed. We now have permission to proceed with the work at upper Sandusky and in Tuscarawas county.

Q. And the property formerly owned by the Chesapeake and Potomac Telephone Company in southeastern Ohio has been and is being consolidated with the property of the Ohio Bell Telephone Company as constituted in September, 1921.

A. You mean the Ohio State. The Chesapeake and Potomac was a Bell company and they merely transferred their property to the Ohio Bell, and the Ohio Bell proceeded to consolidate that property with the competing state property.

[fol. 8658] When I said consolidation of the property, I referred to the physical consolidation of the property.

A. Yes.

Q. In your capacity as chief engineer of the Ohio Bell Telephone Company, are you familiar with the cost and prices of telephone plant and equipment prevailing at the present time and during the past few years?

A. Generally, yes.

Q. Were you present and did you hear Mr. Rhodes, Mr. Allen and Mr. Crunden's testimony during the week of February 25th on the subject of the services rendered by the American Telephone and Telegraph Company to the Ohio Bell Telephone Company under the license contract which is in evidence in this case?

A. Yes, I was.

Q. Do you know whether or not the Ohio Bell Telephone Company and its predecessors here in Ohio have received the services mentioned by those gentlemen?

A. Yes, sir, I do.

Q. Are you free to go to the general staff of the American Company with problems and questions which confront your company from time to time?

A. Yes. We know that the A. T. & T. organization in New York is composed of a large corps of experts, representing every branch of the telephone business, who are always ready to assist us and give us advice along any line that we wish to seek it. I can further state that we have availed ourselves of these services and talent, and we go to them whenever we need their help or assistance.

[fol. 8659] Q. When your company has any special problems or questions to be solved, tell the Commission just how such matters are handled as between your company and the American Company.

Mr. Dotson: We object to that question, because there is nothing to indicate that it will relate to any matter that pertains to this inquiry. It seems to me that the question should be directed or made in such form as will direct the witness' attention to matters that are under inquiry.

Mr. Burr: The question is withdrawn. Excuse me for the interruption. It will save time.

Q. Whenever your company desires to avail itself of the services of the general staff of the American Company pursuant to the license contract, just how do you go about the matter, just how do you go about handling cases of that character?

A. We know that they have a force of competent experts in every branch of the telephone business who have had experience in every state in the Union and who have had problems of almost every nature that might come up. And knowing this, we first consult them when we have any special problem, as there are always several solutions to any particular problem, and because of their wide experience they can very frequently and generally do direct us to the best method of solving these particular problems. The result is that the Ohio Bell has saved a great deal of time and expense, in that it is not necessary for us to experiment you might say.

[fol. 8660] Q. By what means or through what agencies are these problems taken up with the American Company from time to time?

A. Different ways, through correspondence, telephone conversations, telegraph. They send representatives to Ohio at our request or whenever they feel that a problem can better be handled in that manner, or we send our men,

our engineers and others to New York whenever that is the most expedient thing to do.

Q. To what extent if any does the American Company keep the Ohio Bell Telephone Company informed on the subject of developments in the telephone industry and the art as applied to that industry?

A. They keep us constantly in touch with all of the developments in the Department of Development and Research, legal, accounting, engineering, and all matters pertaining to the operation of the telephone plant.

Q. How is that done?

A. Through commercial bulletins, correspondence, circular letters, commercial bulletins; specifications, general engineering circulars, traffic circulars mentioned by Mr. Anthony yesterday and in many different ways.

Q. Do you receive any commercial services in that connection?

A. Yes, commercial bulletins I believe I mentioned and services of all kinds.

Q. What recent work has been done by the American Company in connection with the consideration of outside plant engineering practices if you know?

A. They have been working on this question for some time [fol. 8661] and have recently completed a complete treatise on the most economical manner in which to engineer and design outside telephone plant. These circulars, if you call them that, have been recently considered in consultation with the engineers of various associate companies, in order to not only familiarize the associate companies with the points in this circular, but incidentally possibly we will say to receive any suggestions that the field may have before this is issued as a final circular.

Q. Has your company been consulted from time to time as one of those associated companies in this connection?

A. Yes, sir.

Q. Do you know of any instances wherein your company has been unable to receive the service or help?

A. No.

Q. Of the American Telephone and Telegraph Company?

A. No, I know of no case where we have been refused or turned down on any of our requests or when we sought information from them.

Q. Have you had any special problems in Ohio recently,

wherein the special services of the American company's General Staff were required?

A. Yes, sir, a great many. The unification work in Ohio was really an arduous problem in connection with many others that come up from time to time. I have this a little more in detail if you care to have it. I think perhaps a little bit later might be a better time to give that.

Q. Do you know of any instances wherein the General [fol. 8662] Staff of the American Company handles work of a general nature for the associated companies, including your company, such as, for example, matters before the Interstate Commerce Commission?

A. Yes, they always represent us, continuously represent us in all matters before the Interstate Commerce Commission. I might state that wherever representation of that character is general or covers several companies, they handle that work for all of the associated companies, and of course it saves us time and expense in sending an employee to whatever point these matters are handled. Not only the Interstate Commerce Commission on depreciation mentioned by Mr. Crunden, but also on all revenue matters or accounting matters, and whenever a telephone property is being considered for purchase, such as the Tuscarawas or the Upper Sandusky Company, they obtain the necessary approvals from Washington from the Interstate Commerce Commission for us.

Q. What about the matter of the income tax returns of your company under the Federal Income Tax Law?

A. They prepare our income tax reports, and we haven't that work to do.

Q. Who do you mean by "they"?

A. The A. T. & T. Company. There are a number of other cases right along that line that are fresh in my memory at this time in which they have represented us or rather handled that work for us. In Cleveland recently—this work has been going on for several years—the Cleveland Illumi- [fol. 8663] nating Company has changed its method of arc lighting from the old series arc lighting to the incandescent system. This change of course varied the amount of current which was sent over the lighting circuits, and it caused considerable interference to our service at various locations. We immediately took this up with the A. T. & T. Company, and they, realizing that this problem, although

not entirely new to them, was one that would come up in various parts of the country, sent representatives to Cleveland — undertook to handle this work entirely for us, we merely helping out with records and such incidental work as they might need in connection with other major work.

Q. How was the work taken up in Cleveland?

A. We called them, wrote to them, and told them what our difficulties were, and they immediately got in touch with the situation and saw what it really was and handled it for us.

Q. With whom did the engineers of the American Company negotiate in Cleveland if you know?

A. With the Ohio Bell Company. Another instance——

Q. Just a moment. Did they take the matter up with the Cleveland Electric Illuminating Company?

A. Oh, yes. They worked of course very closely with the Illuminating Company and received wonderful cooperation.

Another instance that we had in Cleveland recently which may be of interest, the Street Railway Company of Cleveland has adopted the remote control of sub-stations, that is, sub-stations are located in various parts of the city and particularly at points where the electric current is more [fol. 8664] economically distributed than from one central station. These formerly were attended by an employee, but they have recently developed a method by which these sub-stations could be started at the proper intervals and stopped without the assistance of an attendant, in other words, from some central point. This again involved the Ohio Bell Company, in that they made use of our cable conductors in operating this automatic equipment, and the A. T. & T. Company sent representatives to Cleveland and worked with the Street Railway Company, the Westinghouse Electric Company and others who had to do with the development of this system. I believe Cleveland will be the first city to have this remote control of sub-stations.

Q. Did any of the representatives of the North Electric Manufacturing Company assist in that matter?

A. Yes, they manufactured some of the automatic equipment, and of course were in on these experiments and the development of this system.

Q. Go back for a moment to the Cleveland Electric Illuminating Company. Tell the Commission whether or not the engineers of the American Company, in connection with

your company and your company's engineers, conferred with the engineers of any other organization or organizations in addition to the engineers of the Cleveland Electric Illuminating Company? To refresh your recollection——

A. The Ohio Bell; we were in on that of course.

Q. Were any engineers of the National Electric Light Association?

[fol. 8665] A. Oh yes, yes, they were vitally interested in it of course.

Q. Did the Westinghouse Electric Company have engineers in Cleveland in that connection?

A. I am not so sure but whether other manufacturers were also represented. This was something of course that was new and promised to be quite a development in the art and I am not sure but what in addition to the Westinghouse there were also other manufacturers of electrical apparatus.

Q. Over what period of time if you know have these negotiations between the engineers of the American Company and those of the Cleveland Electric Illuminating Company extended?

A. Several years to my knowledge. I think about two years. I know it was started at the time I came to Cleveland — they have about completed the work now.

Q. Do you know how much time approximately has been spent by the engineers of the American Company in developing the system which is now in use in Cleveland with reference to the sub-stations of the Cleveland Railway Company?

A. Well, they were working on this on and off for this period of about two years; just the exact number of man days I don't believe I can tell you at this time.

Q. What work if any have the engineers of the American Company done for your company in connection with an order of the Interstate Commerce Commission having reference to the subject of the automatic train control on the Interstate railroads of the country?

[fol. 8666] A. The Interstate Commerce Commission has ordered 94 of the railroads——

Mr. Dotson: Just a minute. How does that relate to this Bell Telephone service?

The Witness: In this way, Mr. Dotson, that that changed character of the current along the railroads, and the telephone company is vitally interested in that, in that it has

signal circuits in some instances on the railroad rights of way, in many instances adjacent, and in a great many instances overhead or across. So the introduction of a different type of signalling from that now employed that necessarily might involve or we felt would involve high tension currents up to a thousand volts, would of course have some deterimental effects to our circuits. So this matter was referred to the A. T. & T. Company, and they have men in charge to handle all this work for the associated companies, and we will receive the benefit of any recommendation which is made when this problem is solved.

Mr. Gentsch: There isn't any of that work in Ohio now, is there?

The Witness: It affects some of the railroads. There are 94.

Mr. Gentsch: But none covered by this hearing?

The Witness: Oh, yes. Ford's railroad is one that is vitally interested, the railroad from Toledo, the Toledo and Iron Mountain I believe.

Commissioner Maullar: The D. T. & I.

The Witness: Detroit, Toledo and Ironton. That has been changed in many ways. That is only another incident [fol. 8667] I might mention at this time that would have a very serious effect on the telephone properties and the A. T. & T. are handling that matter for us directly with Mr. Ford's organization.

Mr. Gentsch: On the electric train control there are no railroads in Ohio that are being affected by that?

The Witness: So far as I know they have not started any of the work in Ohio.

Mr. Gentsch: No.

The Witness: But these 94 railroads extend through Ohio and we are reasonably certain that as this work progresses it will affect Ohio and the Ohio Bell?

Mr. Gentsch: But there isn't anything now? That is the point I want to make.

The Witness: I can't answer definitely that question right at this moment.

Mr. Gentsch: Don't you know that there is not?

The Witness: I haven't any information.

Commissioner Poor: Let the Commission interrupt at this point and just before we recess. The Commission is in receipt of a letter from Mr. Eagon who testified in this case

on February 29th, calling attention to the fact that one of his answers does not appear in the stenographic record as he intended the answer to be. He calls attention to page 682, about half way down the page, where it appears in the record in the following language, "I have no doubt [fol. 8668] that the actual cash saving would be something less than that." He says that this statement is apparently in error in the stenographic notes and should read, "I have no doubt that the actual cash saving would be something in excess of that." He asks permission that the record be corrected to that extent. It means substituting the word "excess" for "less". If there is no objection we can just——

Mr. Dotson: "Something less" would read, "in excess"?

Commissioner Poor: If there is no objection the words "something less than" will be stricken out and the words "in excess" substituted.

And thereupon a recess was had until 1:30 o'clock P. M. of same day. (Thursday, March 27th, 1924.)

[fol. 8669] Thursday Afternoon Session

March 27th, 1924.

Mr. Burr: Mr. McBurney is recalled for further examination in chief.

And also BENJAMIN T. MCBURNEY, recalled as a witness, on behalf of The Ohio Bell Telephone Company, continued his testimony as follows:

Examined by Mr. Burr:

Q. Mr. McBurney, have you examined the contract between the Ohio Bell Telephone Company and the American Telephone and Telegraph Company, marked McBurney Exhibit Number 1 in this case?

A. I have.

Q. What would you say as a practical telephone man of wide telephone experience as to whether or not the services to the Ohio Bell Telephone Company under that contract would, if rendered be or prove of value to the Ohio Bell Telephone Company?

A. I should say they would prove of great value.

Q. Have you read the payment clause?

A. I have.

Q. What would you say as to whether or not the services provided for in the contract are reasonably worth the amount agreed in the contract to be paid for them.

Mr. Dotson: Now, we object. Reading a contract and [fol. 8670] knowing what the contract says and what is actually done in the field of operation are two entirely different things. It is relating performance to conditions, not the provisions of the contract which control.

Question read.

Commissioner Poor: We did not hear all of the previous question. Will you read it?

(Last two questions and answers read.)
(The pending question read.)

Mr. Dotson: I will urge my objection on the grounds mentioned, that it pertains entirely to the provisions of the contract and not to the question of services actually rendered. We are dealing with actualities, not with something that is mentioned in a contract.

Commissioner Poor: This is a hypothetical question put to this witness as an expert. He says if the services, provided for in that contract were rendered.

Mr. Dotson: Inasmuch as we have a better way of proving it, Your Honors, it seems to me we ought to avail ourselves of the better way. These are witnesses in the employ of the company, which is one of the parties to the contract, claiming to know what services are rendered, and the testimony is supposed to relate to the actual services rendered. From that we are to determine whether the services are worth the four and one half per cent on the gross receipts.

Commissioner Poor: No, I think it is the province of the Commission, and ultimately of the court to say whether [fol. 8671] it is worth that. This man is just giving his opinion.

Mr. McConnaughey: That is another ground for objection. It is not a matter for expert opinion.

Mr. Burr: Oh, yes, I think undoubtedly it is.

Commissioner Maullar: I think it is practically his opinion based on a hypothetical question, his opinion as an expert telephone man.

Mr. Dotson: That is true, but it is not the best evidence

here, Your Honor, and inasmuch as the other line of testimony is far better and more reliable and is available, this should not be admitted.

Commissioner Poor: The Commission feels that the objection is not well taken. It will be overruled.

Mr. Dotson: Note an exception.

The Witness: Read the question once more.

(Question read.)

A. I should say they were worth the amount agreed in the contract and more.

Mr. Dotson: I move that that answer be stricken out.

Commissioner Poor: Overruled.

Mr. Dotson: Note an exception.

Mr. Burr: That is all, Mr. McBurney. Will you gentlemen want Mr. McBurney to return for cross-examination?

Mr. Dotson: No, I don't.

Mr. Shuler: I would like to ask him the operating expenses per station of the Cincinnati Telephone Company.

The Witness: I could not give you that off hand, sir.

[fol. 8672] Mr. Shuler: Will you furnish that to me?

The Witness: If it is agreeable to counsel it is agreeable to me.

Mr. Burr: I do not know what materiality it has in this case.

Mr. Shuler: Well, we will show you what it has.

Commissioner Poor: What bearing on the question before us on the 4½ per cent contract and its reasonableness would this have.

Mr. Shuler: A lot of evidence has gone in on the 4½ per cent case which is supposed to be applicable to the rate cases specifically. Now for instance the 4½ per cent contract is to be applicable to each individual rate case, and I believe Mr. Schneider testified yesterday on some things that were supposed to go into the rate cases.

Commissioner Poor: They were enlarged only on stipulation and agreement of counsel.

Mr. Shuler: My purpose is to show the wastefulness of the Ohio Bell Telephone Company in the operation of the telephones.

Commissioner Poor: Well, that might be proper testimony, Mr. Shuler.

Mr. Shuler: He was here and I thought I would get it out of him while he was here.

Mr. Burr: If you could.

Q. Will you furnish that, Mr. McBurney?

A. No.

[fol. 8673] And also G. A. KOSITZKY, recalled, as a witness, on behalf of the Ohio Bell Telephone Company, being first duly sworn, testified as follows:

Examined by Mr. Burr:

Q. Has the American Company done any work of a national character with the National Electric Light Association on behalf of your company?

A. Yes, sir. In about 1921 committees were organized, one representing the electric light companies of the National Electric Light Association, and the other the Bell Telephone Companies. These representatives were mostly —that is, representing the Bell—Were practically all from the A. T. and T. organization. This was for the purpose of working out rules and practices as to the utilization of highways and streets and so on as between the respective wire using companies. This in a manner compliments the orders issued in certain of the states by certain state Utility Commissions. I have here a copy of the report. This is our last report, and in this report it shows the representatives of the A. T. and T. Company, for instance, John J. Carty, Bancroft Gherardi, and D. K. Hall.

Q. Are they all members of the general staff?

A. Yes, sir. And then there are sub-committees, of which Mr. Charles Wolfe, an engineer of the A. T. and T. Company, is chairman.

Q. The report of the joint General Committee referred [fol. 8674] to by the witness may be marked Kositzky Exhibit Number 1 and is offered in evidence?

A. Yes.

And thereupon the report above referred to was marked for the purposes of identification and was offered and admitted in evidence on behalf of the Ohio Bell Telephone Company, and is herewith submitted, marked Kositzky Exhibit Number 1, and made a part hereof.

Q. The foregoing are a few specific instances of services performed by the American Company for your company? Are there any others?

A. Yes, there are quite a few. I have here a list consisting of 144 pages, which just gives the number and title of general engineering circulars, of which there are 1,413, specifications of which there are 612, 52 commercial circulars and 199 traffic circulars. These the Ohio Bell has received from time to time, and its predecessor companies in Ohio, up to about the first of 1924.

Q. Now there are hundreds of pages contained in those specifications and circulars, are there not?

A. Yes, sir. There are 144 pages in the list.

Mr. Burr: The list may be marked Kositzky Exhibit Number 2 and is offered in evidence.

And thereupon the list above referred to was marked for the purposes of identification and was offered and admitted in evidence on behalf of the Ohio Bell Telephone Company [fol. 8675] and is herewith submitted marked Kositzky Exhibit Number 2, and made a part hereof.

Q. Does the work which you have mentioned, such as development work, preparation of standards and kindred things on behalf of the Ohio Bell Telephone Company by the General Staff of the American Company save your company any time or expense?

A. Yes, we could not perform those services ourselves.

Q. You mentioned——

Mr. Gentsch: I ask that all after "yes" be stricken out. It is not responsive. That is purely a volunteered statement.

Mr. Burr: Let the part of the answer referred to by Mr. Gentsch go out.

Q. Could the organization of the Ohio Bell Telephone Company perform services for that company to the same extent as they are now performed by the American Company for it?

A. No, it could not.

Mr. Gentsch: I object. That is purely a conclusion. It is a matter for them to tell what the services were and then for this Commission to determine what if any value

they have. A comparison of that kind is not proper. It cannot be justified under any rule of evidence.

Mr. Burr: It is certainly competent for this witness to say that this company has no force of men with which to do this work.

(Question and answer withdrawn.)

[fol. 8676] Q. Has your company an organization for the purpose of performing research and development work similar to that done by the American Company for your company?

A. No, sir.

Q. Have you any other source of receiving the same assistance as that rendered by the American Company to your company?

A. No, sir.

Q. Do you know whether it would be possible or practical from the standpoint of finances alone for your company to maintain an organization which would furnish, if it could, the services now received by your company from the American Company.

Mr. Gentsch: I object to the question.

Commissioner Poor: What is the ground of the objection.

Mr. Shuler: My ground is that he does not state which one of the services he is talking about. This General Staff performs many services that are perfectly ridiculous for the Cleveland Telephone Company, for instance, radio and long distance lines and experimental work for the Western Electric. It would be silly for the Cleveland Telephone Company to attempt to perform any of those services in the first place. Secondly, what does this man, an engineer, know about the financial condition of the Cleveland Telephone Company or the operating side of it.

Mr. Gentsch: And there is another objection to that. It is about as broad in scope as can be, and it is an attempt [fol. 8677] to get in under a general question an opinion that is just about as broad as the English language can be. The question here is, what are the services that the A. T. and T. perform to either the Ohio Bell or its constituents or in the toll service, that is to be considered as part of charge which the people of Ohio ought to pay? Now if there are some services that are rendered here that are of value and that value is established, that is one thing.

But the questions that have been asked here all day, yesterday and today, have been most of them just as broad as they can be and take in the earth and put a fence around it, and calling for conclusions constantly that are clearly beyond the power of the witness to give an opinion on. I have not been objecting very much. I just got in here a little bit late and I have been a little modest, but it has been growing on me all the time just the same.

Mr. McConnaughey: The answer no, would imply that they could not perform any of those services.

Commissioner Poor: This man has qualified as head of the engineering department of the Ohio Bell Telephone Company and he should be in position to know something about what the engineering department of the Ohio Bell Company does do or can do, and if the question is limited to the Ohio Bell Company, could it do the work which the A. T. and T. does for the Ohio Bell, that will cut out the objection Mr. Shuler raises about the radio and the other propositions.

[fol. 8678] Mr. Gentsch: I think Mr. Shuler's objection goes to the vital end of it, because this is entirely too broad. And I say, the question here is what services are rendered by the A. T. and T. and what are their values? But this question goes away beyond that, and as I say it takes in—Just read it—it takes in the world and puts a fence around it.

Commissioner Poor: It must be limited to the services performed by the A. T. and T. to the Ohio Bell Telephone Company.

Mr. Burr: Note an exception.

Q. Mr. Kositzky, has that company the means of performing within its own organization the services rendered for it by the American Company under the license contract?

A. No, we have not.

Q. Do you know whether or not the cost to your company, if it would be so organized as to furnish those services for itself, would be greater or less than the amount paid for the services to the American Company.

Mr. Gentsch: I object to the question. There we are again, just as broad as it can be, taking in everything, and it assumes that all of the pretended services that are being rendered are necessary, which we deny.

Mr. Burr: It does not assume that.

Mr. Gentsch: We say a lot of this stuff that has been accumulated here is here for the purpose of making a show on paper of the things done, but there is no evidence here of any necessity for a large majority of the services which are [fol. 8679] rendered. The whole evidence here assumes that it is necessary and is of value, but there isn't any necessity shown.

Mr. McConnaughey: If the Commission please, the question, it seems to me, should be what would it cost the Ohio Bell Company to perform these services that the A. T. and T. performs for them.

Mr. Burr: I was going to ask him that next.

Mr. Gentsch: I think that is too broad.

Commissioner Poor: The question is directed to this witness' knowledge. If he don't know, he can say so. If he does not know he indicates that way. If he answers that he does know, you can go into that on cross-examination.

(Question read.)

Mr. McConnaughey: The answer is yes. "Will you have coffee or tea?" "Yes."

Mr. Burr: If he says yes, then that means that he does know.

Mr. Dotson: Are you sure that he means that.

The Witness: Yes.

Q. In your judgment, are the services worth more than the amount paid for them?

A. Yes, sir.

Mr. McConnaughey: I object.

Q. You mentioned receiving——

Mr. McConnaughey: Now wait a minute.

Mr. Gentsch: There is another objection. There is one continuous leading question put by counsel over there, put- [fol. 8680] ting words into the mouth of the witness. It has been going on all day yesterday and today. He knows better than that.

Commissioner Poor: The objection will be overruled.

Mr. Gentsch: Note an exception.

Question read.

A. Yes, sir.

Q. Will you briefly point out some of the general engineering circulars, and if you have copies will you produce them so that they may be offered in evidence as exhibits?

A. Yes, there are over 2,000 circulars, bulletins and so on, and I will just point out a few hurriedly so as to save time.

Mr. Shuler: Give the dates please of the circulars.

The Witness: All right. On page 32, general engineering circular Number 473, issued July 28th, 1914 on Duplex cable. Duplex cable, as Mr. Rhodes explained quite in detail—if you care to I will be glad to say that that is a cable in which the conductors are so arranged that over two pairs of conductors a third circuit, or what is sometimes called a phantom circuit, may be used. Now to this general engineering circular are attached six specifications. I merely want to bring out that, because there are a number of specifications in this list, and there are six typical specifications which are a part of that general engineering circular on Duplex cable.

Q. What are the numbers of the specifications?

A. They are 3660, 3656, 3663, 3657, 3658, and 3591.

[fol. 8681] Q. Are there also some tables showing the combinations of quadded and non quadded conductors?

A. It also shows two tables which show the economical arrangement or set-up in order to maintain full use of the space within the maximum size sheath of a cable.

Mr. Burr: The circular may be marked Kositzky Exhibit No. 3 and is offered in evidence.

And thereupon the circular above referred to was marked for the purposes of identification and was offered and admitted in evidence on behalf of the Ohio Bell Telephone Company, and is herewith submitted, marked Kositzky Exhibit Number 3, and made a part hereof.

The Witness: Another sample that I have a copy of here, Mr. Burr, is shown on page 36, general engineering circular Number 327; that is issued July 1st, 1915 on toll fundamental plan. A toll fundamental plan is a study which looks towards the future as to the most economical manner in which to design and build a toll plant, the proper time to install toll cables, a proper arrangement of toll center checking points and so on.

Mr. Burr: It may be marked Kositzky Exhibit Number 4 and is offered in evidence.

And thereupon the plan above referred to was marked for the purposes of identification, and was offered and admitted in evidence on behalf of the Ohio Bell Telephone [fol. 8682] Company, and is herewith submitted, marked Kositzky Exhibit Number 4, and made a part hereof.

Q. These specifications to which you are now testifying are in addition to those covered by Mr. Rhodes' testimony are they not?

A. Yes, sir.

Q. Are they all circulars received by your company from the American Company?

A. Yes, sir. On page 68, general engineering circular Number 982, issued July 1st, 1920, on non-multiple private branch exchange switchboards for operation with machine switching central offices. That is a new development by the A. T. and T. Company which makes it entirely possible to connect an automatic private branch exchange, or rather a private branch exchange with an automatic system, in a manner so that direct supervision and through dialing may be had.

Commissioner Maullar: What is the date of that circular?

The Witness: July 1st, 1920.

Mr. Burr: It may be marked Kositzky Exhibit Number 5, and we offer it in evidence.

And thereupon the circular above referred to was marked for the purposes of identification and was offered and admitted in evidence on behalf of the Ohio Bell Telephone Company and is herewith submitted, marked Kositzky Exhibit Number 5, and made a part hereof.

[fol. 8683] Mr. Shuler: Are all these exhibits in addition to the exhibits we had at the previous hearing?

Mr. Burr: Yes, there is no duplication.

The Witness: I just picked out a few, those that I thought might be of interest a little later on in some other parts of the testimony which I wish to refer to specifically. On page 61, general engineering circular Number 1025, dated February 18th, 1921, on the reduction of thickness of cable sheath. I merely mention that for the reason that Mr. Rhodes dwelt at some length upon the savings effected to the associated companies, perfected because of the study of the proper thickness of cable sheath to use for various purposes in a telephone plant.

Mr. Miller: What page is that on.

The Witness: Page 61.

Mr. Burr: It may be marked Kositzky Exhibit No. 6 and is offered in evidence.

And thereupon the circular above referred to was marked for the purposes of identification and was offered and admitted in evidence on behalf of the Ohio Bell Telephone Company, and is herewith submitted marked Kositzky Exhibit Number 6, and made a part hereof.

Q. What is the next one?

A. Page 82, Number 1174, issued June 29th, 1922. The subject is small gauge non-quadded cables, manufactured with a staggered pair twist. That is the introduction of a cable which overcomes some of the objections under certain [fol. 8684] conditions that were experienced with the former cable, and there are many localities where it can be used to a very great advantage.

Q. Mr. Kositzky, when you refer to pages 32, 36, 68, 71 and 82 and subsequently when you refer to pages in that way, do you refer to the paging in the Kositzky Exhibit Number 2?

A. Yes, sir, that is right, yes, sir.

Mr. Burr: The last circular referred to may be marked Kositzky Exhibit Number 7 and is offered in evidence.

And thereupon the circular above referred to was marked for the purposes of identification and was offered and admitted in evidence on behalf of the Ohio Bell Telephone Company, and is herewith submitted, marked Kositzky Exhibit Number 7, and made a part hereof.

The Witness: On page 83 of Exhibit Number 2, general engineering circular No. 1187, issued August 1st, 1922, is a number 1-A transmission measuring set with a number 2 oscillator. This not only describes a new instrument devised by the A. T. and T., but also is used in order to detect troubles in the telephone plant which have been rather difficult to detect before, at least not with the same ease with which it is possible with the introduction and use of this instrument.

[fol. 8685] Mr. Burr: It may be marked Kositzky Exhibit Number 8 and is offered in evidence.

And thereupon the circular above referred to was

marked for the purposes of identification and was offered and admitted in evidence on behalf of the Ohio Bell Telephone Company, and is herewith submitted, marked Kositzky Exhibit Number 8, and made a part hereof.

Q. Have you Exhibits typical specifications received by your company from time to time from the general staff of the American Company?

A. Yes, sir. My Exhibit Number 3 on quadded cable had attached six specifications. I have just one or two more. Page 107 of Exhibit Number 2, specification Number 2880, 6,000 pound strand. That is manufactured and inspected under this specification. That is, the material is manufactured and inspected under this specification.

Mr. Burr: It may be marked Kositzky Exhibit Number 9 and is offered in evidence.

And thereupon the specification above referred to was marked for the purposes of identification and was offered and admitted in evidence on behalf of the Ohio Bell Telephone Company, and is herewith submitted, marked Kositzky Exhibit 9, and made a part hereof.

The Witness: There is another one on page 116 of Exhibit Number 2. I don't know just the date of that. It [fol. 8686] is Number 3643. It is a provisional specification for a concrete steel re-enforcement of poles. That is the method that is designed by the A. T. and T. Company in order to re-enforce poles in order to prolong their life.

Mr. Burr: It may be marked Kositzky Exhibit Number 10 and is offered in evidence.

And thereupon the specification above referred to was marked for the purposes of identification and was offered and admitted in evidence on behalf of the Ohio Bell Telephone Company, and is herewith submitted, marked Kositzky Exhibit Number 10, and made a part hereof.

Q. What is the last specification to which you desire to call attention at this time?

A. Number 363, that is. There is just one more, on page 130, that I have copies of that you will probably want to see, and that is Number 4146, listed on page 130 of Exhibit Number 2. It is a material specification of galvanized pole steps.

Mr. Burr: It may be marked Exhibit Number 11 and is offered in evidence.

And thereupon the specification above referred to was marked for the purposes of identification and was offered and admitted in evidence on behalf of the Ohio Bell Telephone Company, and is herewith submitted, marked Ko- [fol. 8687] sitzky's Exhibit Number 11, and made a part hereof.

Q. Now you have referred to typical circulars and typical specifications. Have you samples of typical bulletins that your company has received from time to time from the American Company?

A. Yes, sir. General engineering circular Number 982, which is made an exhibit, one of the bulletins presented, includes a bulletin Number 12 and a Bulletin Number —. I will just refer to them. Also circular Number 1025. That includes bulletin Number 15. I have one on transmission equivalents.

Q. Just a moment. The Exhibit last referred to is G. E. C. 982?

A. Those are in, Mr. Burr.

Q. They are already in?

A. Yes, I merely call attention to the fact that they are attached to those exhibits as bulletins.

Mr. Burr: I see. May it be understood that they are admitted as a part of the previous exhibit to which they are attached?

The Witness: I have a bulletin that is rather interesting on transmission equivalents. It is not one that is listed in this list on Exhibit Number 2. It really is you might say the transmission engineer's Bible. It computes the transmission equivalents measured in standard units, the standard transmission unit being a mile of 19 gauge wire in cable. It takes all of the item of plant and equipment and equates them in transmission equivalents, and the combination of these equivalents tells the engineer, rather [fol. 8688] instructs him how to design his plant in order to give standard transmission.

Mr. Burr: It may be marked Kositzky Exhibit Number 12, and we offer it in evidence.

And thereupon the bulletin above referred to was

marked for the purposes of identification and was offered and admitted in evidence on behalf of the Ohio Bell Telephone Company, and is herewith submitted marked Kositzky Exhibit Number 12 and made a part hereof.

The Witness: Another bulletin that might be of interest is Number 86 on the Number 22 type telephone repeater. I think that would be of interest since the repeater played such an important fact in the long distance transmission.

Q. What is the date of that bulletin?

A. I haven't the date here. It is indicated on the bulletin.

Q. September, 1923, I see is the date?

A. Yes, sir.

Mr. Burr: It may be marked Kositzky Exhibit Number 13 and is offered in evidence.

And thereupon the bulletin above referred to was marked for the purposes of identification and was offered and admitted in evidence on behalf of the Ohio Bell Telephone Company, and is herewith submitted marked Kositzky Exhibit Number 13, and made a part hereof.

[fol. 8689] Q. What has the development of the repeater such as the Number 22 type permitted in the way of extension of transmission?

A. Transmission before the introduction of this repeater was about 1200 miles, and with the introduction of these repeaters, we are now able to talk 5,500 miles approximately.

Mr. Shuler: May I ask a question for my own information on that?

Mr. Burr: Yes.

Mr. Shuler: Repeaters are not used in anything but toll line business; is that right?

The Witness: That is right.

Q. Have you samples of typical commercial bulletins which are included in the list of 52 in Exhibit Number 2?

A. Yes, sir, I have on page 133 of Exhibit Number 2, quite a list of commercial bulletins, one Number 14 on commercial survey work that I think would be of interest since we do a great deal of that work in Ohio.

Mr. Burr: It may be marked Kositzky Exhibit Number 14.

And thereupon the bulletin above referred to was marked for the purposes of identification and was offered and admitted in evidence on behalf of the Ohio Bell Telephone Company, and is herewith submitted marked Kositzky Exhibit Number 14, and made a part hereof.

Q. What is the date of the circular last referred to?
[fol. 8690] A. Let's see. I haven't a copy of the circular—November 14th, 1921.

Mr. Burr: It has been marked Exhibit Number 14, and I believe has been offered in evidence. If not I will offer it now.

Q. What is the next commercial circular?
A. On page 135, Exhibit Number 2, I show two Number 49 commercial surveys, forecasts of future population; also Number 50, commercial circular, forecast of future market for telephone service.

Mr. Burr: It may be marked Kositzky Exhibit Number 15 and Kositzky Exhibit Number 16.

And thereupon the commercial circulars above referred to were marked for the purposes of identification and were offered and admitted in evidence on behalf of the Ohio Bell Telephone Company, and are herewith submitted, marked Kositzky's Exhibits Numbers 15 and 16, and made a part hereof.

Mr. Shuler: May I ask a question for information?
The Witness: Yes.
Mr. Shuler: Will this give specific data or does it merely refer to other circulars for the data whereby I may project in the future the amount of telephones to be installed in Cleveland.
[fol. 8691] The Witness: This, Mr. Shuler, will tell you how to do it.
Mr. Shuler: This will tell me right here?
The Witness: All three you have there will tell you how to do it. Furthermore if you are interested, we have done that, and I think I can give you something on that, about the future population of Cleveland.
Mr. Gentsch: That is the Ohio Bell has done that.

The Witness: With the assistance of the A. T. & T.

Mr. Shuler: What I am interested in is to project into the future the number of changes and removals that we may anticipate in Cleveland.

The Witness: We do that too.

Mr. Dotson: Will that help us likewise in Toledo?

The Witness: Yes.

Q. What is the date of Kositzky Exhibit Number 15?

A. November 26th, 1923.

Mr. Burr: The gentleman on the other side will understand that the exhibit of course speaks for itself and the only reason I am referring to dates here is to provide against the necessity of going back through the record and going over the exhibits at sometime in the future.

Mr. Hagelbarger: There is no objection.

Q. What is the date of Exhibit 16?

A. November 28th, 1923.

Q. How are the specifications prepared which you re- [fol. 8692] ceive from the American Company covering the methods of doing the work intended for the more general use of the working forces.

A. For the working forces, those are in convenient pocket or hand book size and they are issued directly to the working forces.

Q. How many of such handbooks for the use of the workmen of your company have you received from the American Company?

A. There is a list of 91.

Q. Have you the list there?

A. The list is included in this Exhibit Number 2.

Q. Yes. Have you some typical samples of the handbooks?

A. Yes, I have.

Q. I call your attention first to the one on substation wiring, specification 3853, which may be marked for identification as Kositzky Exhibit Number 17?

A. They are all dated, in case that is of any interest.

Q. What is the date of Exhibit 17?

A. March 1st, 1917.

And thereupon the specification above referred to was marked for the purposes of identification as Kositzky Exhibit Number 17.

Mr. Burr: The next one is the handbook on general cable splicing, specification 3912. It may be marked for identification Kositzky Exhibit Number 18, and I will ask you to state the date.

The Witness: That is January 1918.

[fol. 8693] And thereupon the handbook above referred to was marked for the purposes of identification as Kositzky Exhibit Number 18.

Mr. Burr: The next one is specification Number 3613 on underground conduit construction, which may be marked Kositzky Exhibit Number 19.

The Witness: That is one of the earlier ones. That is still up-to-date, and the date of that is 1913.

Mr. Shuler: What is that number? 18?

The Witness: 19.

And thereupon the specification above referred to was marked for the purposes of identification as Kositzky Exhibit Number 19.

Mr. Burr: The next one is specification Number 3929, serial cable construction. It may be marked Kositzky Exhibit Number 20. I will ask you to state the date of that exhibit.

The Witness: That is issued in May, 1919.

And thereupon the specification above referred to was marked for the purposes of identification as Kositzky Exhibit Number 20.

Mr. Burr: Specification Number 3926, pole line construction is the next, and is marked for identification Kositzky [fol. 8694] Exhibit Number 21. What is the date of that specification?

The Witness: That was issued in August, 1922.

And thereupon the specification above referred to was marked for the purposes of identification as Kositzky Exhibit Number 21.

Mr. Burr: Kositzky Exhibit Numbers 17 to 21 inclusive are offered in evidence.

And thereupon the specifications and handbooks above offered were admitted in evidence on behalf of the Ohio

Bell Telephone Company, and are herewith submitted, marked Kositzky Exhibits Numbers 17 to 21, and made a part hereof.

Q. For the most part are the subjects covered by the remaining specifications not in handbook form, but referred to in your Exhibit Number 21

A. They are primarily materials. We haven't specifications for all materials used. For instance, a great many of the items are manufactured by the Western Electric Company and we haven't a specification of the same type as we have for materials that are manufactured for the Western Electric or for the Bell Companies, but I have a material catalogue which might be of interest, in that it includes practically all of the materials used by the telephone company, the Ohio Bell Telephone Company as plant construc-[fol. 8695] tion. You will note in there it specifies specification numbers where the A. T. and T. have issued specifications and in cases it refers to drawings that have been furnished from time to time by the A. T. and T. Company and not necessarily in specification form, and there are other items of material that are manufactured by the Western Electric Company. This catalogue is very convenient for the use of the field forces in that it tells them what materials to use and how to order them, and in some instances where to use them.

Q. Who prepared the catalogue?

A. That was prepared in my office.

Mr. Burr: It may be marked Kositzky Exhibit Number 22 and is offered in evidence.

And thereupon the catalogue above referred to was marked for the purposes of identification and was offered and admitted in evidence on behalf of the Ohio Bell Telephone Company, and is herewith submitted, marked Kositzky's Exhibit Number 22, and made a part hereof.

Q. These specifications numbers and references in this catalogue are to specifications and kindred information furnished by the American Company to your company?

A. Yes, sir, that is right. It is merely what we receive from time to time and use. For instance, on page 19, cable composite and large gauge, specification Number 3760, that is a specification for that particular cable, and you will find

it in Exhibit Number 2, just what page I cannot say, and on [fol. 8696] the other page, on page 18, is cable MM specification 4123; that is an A. T. and T. specification.

Mr. Burr: The catalogue has been marked Kositzky Exhibit 22, and we offer it in evidence.

The Witness: I was going to say on page 25 for instance, about the middle of the page, is a C. S. ground clamp, drawing Number 46 L 32. That is an A. T. and T. drawing number. There is no specification for it, but it is probably in one of the bulletins. I can't say offhand. But that gives us the information.

Mr. Dotson: But this catalogue is prepared solely by your department and not by the A. T. and T. Company?

The Witness: No, I merely show that at this point, Mr. Dotson, to give you more or less a complete list of the things we receive from the A. T. and T., and has it in the best form that I knew of to present it to you.

Mr. Dotson: It is prepared in catalogue form for your own convenience, so that you can readily get at the various kinds of equipment?

The Witness: Yes, sir. That is right.

Q. Have you some photographs which illustrate the methods and show the materials actually used in the work.

A. Yes, I have here a list fitted to photographs, which I will not go through in detail, which shows the applications of the materials, the methods that have been supplied by the A. T. and T. Company and used in our day to day construction.

[fol. 8697] Mr. Burr: The list, together with the photographs referred to in the list, are marked for identification Kositzky Exhibit No. 23 and offered in evidence in its entirety.

And thereupon the list and photographs above referred to were marked for the purposes of identification and were offered and admitted in evidence on behalf of the Ohio Bell Telephone Company, and are herewith submitted, marked Kositzky Exhibit Number 23, and made a part hereof.

Q. The descriptive sheets which accompany the photographs refer to the specifications do they?

A. Yes. I tried to make these self-explanatory by show-

ing on one page the specifications which are listed in the photograph and have reference letters on the photograph, corresponding reference letters. It may be interesting to point out one or two. Take Number 1. That shows development by the A. T. and T. Company of a cable vault. This is where the cables from a single central office enters the telephone building. They come in through the ducts from the street and are supported on hangers and then they go from the vault which is usually in the basement, to the floor on which is located the main distributing frame. The peculiarity about this vault—of course vaults had been used for many years—but this particular vault or this improvement over the old vault, is that cable coming in a certain duct, the location in the conduit system is determined primarily by the position of the cable, that is, the direction [fol. 8698] it takes from the street, in that manhole. Now you cannot use any particular duct. There is a certain duct in which that cable must be placed in order to give you the best arrangement in manholes when you get into the building. You cannot take the first vacant strip without some confusion in the vault, so that this is what is called a flexible vault, designed to make it possible to bring in cables without interference, which means that the vault would be congested and the cables would be so arranged as to not be accessible; but in this particular case the cables come in and they can take any position on the frame that might be vacant without any crossing or interference, which of course means difficulty in the future if not obviated.

Q. You mean that you do away with the annoyance in the future by this method?

A. Yes, sir. Number 3 might be of interest. It shows the main distributing frame, Cables from the vault are terminated and fanned out at that place. What you see there are the protector blocks, carbons and micas and the heat coils. There are references there to the specification numbers employed and also to the materials employed.

On page 5 is merely a list of materials commonly used in serial underground house and block cable work. Those are listed in the material catalogue. This gives a photograph to give an idea of some of the materials that are commonly used in this work.

On page 6 is another photograph of materials used in [fol. 8699] pole line work.

Referring to the methods, I think Number 7 is one of interest. It shows a street in which the telephone and electric light companies use a single pole line. This practice has been under development for a number of years. The A. T. and T. were the pioneers in advocating the joint use of poles. Before the introduction of this joint use, with which the electric companies had a great deal to do and a great deal of co-operation work was necessary in order to arrange satisfactory use of the poles, as a part of the development by the A. T. and T. Company. I might mention that Mr. Rhodes was the chairman of one of the first committees in that work as early as 1910. I think the first report issued by the E. N. L. A. was by Mr. Rhodes as the chairman of that committee, and this is merely a development of the safe and satisfactory use of poles by the wire using companies.

Mr. Gentsch: Don't you have more or less trouble with interference there.

The Witness: Yes, we do. I want to bring that point out. I am glad you asked that, Mr. Gentsch. Take on page 7, you notice the electric light wires are at the top of the pole, and the point marked A, points to a service wire, not very plainly distinguishable in this photograph. That leads from the top part of the pole to a house on the left hand side. You notice that wire is clear of everything. Now down lower that heavy line about half way up the page is a telephone cable. Now telephone wires drop off from that point, although I do not [fol. 8700] see any on this picture. Yet you will note that a wire which would lead from this point to a house on the left hand side would be considerably underneath the other wires. In other words, there is a safe clearance. The same way with wires on the opposite side to houses on that side of the street. This, I might say, is also in accordance with administrative order No. 72 issued by this Commission, formerly Order Number 65. I think it might be of interest here, Mr. Burr, to show from other photographs, since Mr. Gentsch raised the point, of what happens where they are not joint, that is, the old construction where there are two pole lines on opposite sides of the street, the one carrying the electric light wires and the other carrying the telephone wires.

Mr. Burr: Just a moment. The photographs to which you are now referring and numbered 1, 2 and 3 in a separate cover may be marked as an Exhibit, Kositzky Exhibit

Number 24, and we offer the exhibit in its entirety in evidence.

And thereupon the photographs above referred to were marked for the purposes of identification as Kositzky Exhibit Number 24.

The Witness: This next set of photographs shows a duplicate pole line. You see there that either pole line is sufficiently large to carry the wires of both companies. The ones [fol. 8701] on the left hand side are electric light poles and the ones on the right side are telephone poles.

Q. Where were these photographs showing the double lines of poles in a single street taken, that is to say, those referred to in Exhibit Number 24?

A. There are several there.

Q. I will call attention to a photograph marked Number 1 in that exhibit?

A. I happen to know this particular location. These poles were set in 1920 in North Toledo, Royalton Road. The light poles were set first, but the same year the telephone poles followed.

Q. Is that in the Toledo Exchange area?

A. Yes, sir.

Q. What about Number 2?

A. Photograph Number 2 is a photograph of a similar location, where you notice the telephone poles on the right hand side of the street and there you will find sufficient space which would carry the wires on the left hand side of the street, which are electric light wires.

Q. Where was the photograph taken?

A. That was taken on Foster street in Toledo.

Mr. Dotson: I would like to ask one question. I have only one in mind anyway at this time. Photograph Number 1, the poles on the left hand side of the street, shown there, seem to carry two sets of wires. Do you know Mr. Kositzky what the lower set of wires is?

The Witness: Yes, sir, the lower set are wires of the Ohio State Company, at that time the Ohio State Telephone [fol. 8702] Company was in existence.

Mr. Dotson: And the upper wires are electric light wires?

The Witness: Yes, sir, electric light.

Mr. Dotson: How long ago was this taken?

The Witness: This picture was taken recently, but the poles were erected in 1920.

Mr. Shuler: Mr. Kositzky, wouldn't this indicate that the Ohio State people were using joint poles earlier than the Ohio Bell?

The Witness: In Toledo they were probably forced to use the other poles. I do not believe the Ohio Bell would willingly consent to its competitor using its plant to further its own business. So they no doubt used the other poles, whether by the consent of the city or not, I do not know.

Mr. Dotson: Out in this Section of Royalton Road, West Toledo, the poles used there by your company were used because a competitor was using the pole on which the electric light wires were used?

The Witness: No, that is not the point. That estimate had been submitted for approval for a new pole line on that street. It was my first visit to Toledo and I raised this same question, "Why not use this electric light pole line just built?" And my information was that they were not permitted to use it under the ordinance in Toledo, existing at that time in Toledo.

Q. Where did you get the information, do you remember [fol. 8703] that?

A. From our people.

Q. You did not get the information from Mr. Green, the city electrician?

A. No, but I asked for a copy of the ordinance and I had a copy of the ordinance which—I cannot recite it in detail—specifically states that telephone wires should not be placed on poles carrying a voltage of 300; that is the voltage limitation of that particular city ordinance.

Mr. Dotson: Do you know that in Toledo in districts like this of Royalton Road, the electric light wires and telephone wires are carried and are permitted to be carried upon the same pole lines?

The Witness: They may be now, but they were not then, Mr. Dotson.

Mr. Dotson: Well, they were at that time, because the Ohio State lines were on them.

The Witness: Yes, apparently—of course they placed their wires, whether by——

Mr. Dotson: Is there any place in Toledo——

Mr. Burr: Let him finish his answer.

Mr. Dotson: All right, weren't you through?

The Witness: No.

Mr. Dotson: Go ahead.

The Witness: I do not believe—in fact, we cannot get a permit from the city to place wires on electric light poles except some few restricted places.

Q. Do you know of any other cities in the territory served by the Ohio Bell Telephone Company where the similar [fol. 8704] restrictions exist?

A. Very few. I know of no others. But photograph Number 30 is interesting since it specifically shows the point raised by Mr. Gentsch. This is only of interest in that respect. There you have a light pole on the right hand side of the street and telephone on the left. You will note that the service wires from the electric light line, which are shown falling off from about the third pole, in passing to the residence on the left hand side practically passes very close to the telephone wires, and the same say with the telephone wires dropping from the pole on the left hand side, which is shown on the second pole, and passing to the right must necessarily pass through the electric light wires, and in this case are fairly close. Now we have more trouble, more damage to plant, oftimes to people, from conditions just such as this, which under the photograph Number 7 in the former exhibit practically is impossible.

Mr. Dotson: Now with reference to the pole line on the left side of this street in Photograph 3, the upper wires are the telephone wires, the top wires.

The Witness: Yes, sir.

Mr. Dotson: And the electric light wires are below?

The Witness: No, they are not on that pole line at all. They are on the opposite side of the street.

Mr. Dotson: What are those wires on the side of the poles on the left hand side of the street.

The Witness: Those are also telephone wires, but are [fol. 8705] covered wires.

Mr. Dotson: Those are the Ohio State wires or formerly the Ohio State wires?

The Witness: No, not those.

Mr. Dotson: They were not?

The Witness: No, I am pretty sure that those were not.

Mr. Dotson: Do you know what district that is in.

The Witness: I think that is on Burton Avenue, Toledo.

Mr. Dotson: Is that Toledo?

The Witness: Yes, sir. I might further explain, Mr. Burr, that construction is not strictly in accordance with the Commission's administrative order Number 72. If I may be permitted here to cite you to just one or two paragraphs in this order——

Q. To which construction, Mr. Kositzky, are you referring?

A. That is administrative order Number 72, issued by this Commission.

Q. Which construction do you say is not in accordance with that?

A. This last exhibit.

Q. All three photographs?

A. Yes. On Page 9 I will read paragraph 100-3, "Location of lines." Where. The same highway. Local supply lines. Joint use is generally preferable to separate lines, except sometimes in rural districts and except where the character of the circuits involved make- separate lines [fol. 8706] on the opposite sides of the highway more desirable". That exception refers to toll lines and high tension electric light wires.

Mr. McConnaughey: What are you reading from?

The Witness: This is administrative order Number 72 issued by this Commission. Page 127 is Section Number 600 which is devoted entirely to rules for jointly using wood pole lines carrying supply circuits and signal circuits. By signal circuits it means telephone, telegraph, police, fire, or any wires used for signal purposes.

On page Number 9 again paragraph 100-1, the paragraph there says:

"Sections 100 to 800, which include Number 600, inclusive, of these rules shall be observed in the construction and reconstruction of overhead and underground supply lines and signal lines and in the maintenance and operation of such lines as specified therein and operated in connection with public utilities, either privately or municipally owned."

I might put this in as an exhibit.

Mr. Dotson: Is that the exhibit referred to a moment ago?

The Witness: No.

Mr. Burr: Oh, no, this is administrative order Number 72 of the Public Utilities Commission of the State of Ohio.

Mr. McConnaughey: What is the relevancy of that.

Mr. Burr: It may be marked for identification Kositzky Exhibit Number 25. It is offered not only as illustrative [fol. 8707] of the testimony of the witness just given, but also because it shows the participation by the representatives of the American Telephone and Telegraph Company in the preparation of the data comprising the order.

Mr. McConnaughey: Where does it show that?

Mr. Burr: By reference to pages 3 and 4 you will see that the rules and regulations are the result of the cooperation of the railroads and the public utilities operating in the State of Ohio. The basis of these regulations was a tentative set of rules and specifications formulated by a general committee representing the various classes of utilities in Ohio. To these utilities who have co-operated and to the general committee on rules the Commission wishes to express its appreciation of their splendid work. Signed, The Public Utilities Commission of Ohio. Then follows personnel of the general committee, included among which are Mr. K. L. Wilkinson, of the American Telephone and Telegraph Company, referred to in Mr. Rhodes testimony. Also on page 4, you will find the name of Mr. W. M. Kraft, representative of the American Telephone and Telegraph Company, Mr. D. H. Keyes, representing the same company, and Mr. J. H. Moore, representing the same company. The exhibit is further offered as indicating something of the work necessary to be done by the wire using companies, including the General Staff of the American Company, for the Ohio Bell Company, in connection with this single matter of the joint construction by wire using companies in Ohio, and the protective meth- [fol. 8708] ods devised in connection with that construction.

The Witness: May I proceed with the photographs, Mr. Burr?

Mr. Burr: Yes. Exhibit Number 25 is offered in evidence.

And thereupon the document above referred to was offered and admitted in evidence on behalf of the Ohio Bell Telephone company, and is herewith submitted, marked Kositzky Exhibit Number 25, and made a part hereof.

The Witness: Photograph Number 11 shows the application of specification Number 3927, titled, Guying, and 2939 on aerial cable construction. Number 14 is interesting——

Q. Just a moment please. You are now referring to photographs in Exhibit Number 23?

A. Yes, sir.

Q. Proceed.

A. Number 24 is interesting. Mr. Rhodes covered quite completely underground cable or rather paper insulated cable. Number 14 shows a cable splicer in the act of splicing the wires, the paper insulated wires.

We have a specification Number 3912, which goes into considerable detail on how to properly splice these cables. It is very important in splicing these cables that they be properly connected where they are so many wires in one sheath, that they be properly handled so as not to have any deteriorating effect on the cable and upon final con- [fol. 8709] nection or splicing the wires, to seal the entire joint or splice as we call it in a water proof or air tight splice; in other words, called a plumbers' joint. I have a picture later on referred to as a complete splice.

Q. Do you know the size of the cable shown there?

A. Yes, sir, that is 400 pair 22 gauge cable.

Q. And the job is therefore three times as complicated in the case of 1200 pair?

A. Yes, sir. Number 15 shows detail of that work in aerial cable, that is splicing of a strand. The development of that item of material marked C, that is, the strand connection made it possible to splice strands carrying tremendous loads. Before that the wire itself would cause a short bend, and it would break the strand. It was necessary to make the splice formerly around the pole. But with the introduction of this item strand can be connected at any point, saving both labor and time and expense.

Q. Was that developed by the American Company?

A. Number 20 shows the materials commonly used in underground conduit construction. That is listed in the material catalogue, entered as an exhibit. 21 shows what we call block cable construction. That is covered in specification Number 3931. This also shows block cable wiring. The wires you see at the cable are the wires that connect the cable with the various telephones, the terminal being

the junction of the wire with the cable. That is listed in Number 3932.

[fol. 8710] 24 shows a drop wire or a wire connecting a subscribers' telephone to a pole line. It shows the entrance of the wire into a residence. This is covered in specification Number 3930, method of doing that portion of the work.

25 is another photograph of a drop wire joint.

26 shows some of the materials used in specification work.

Q. Is that material all developed by the American Company?

A. Yes, sir.

Q. The design for it?

A. When you say "all" I will say at least most of it, and I know of none that is not developed by them.

Number 28 shows another mechanical or cable splicer, splicing a cable in a manhole. In large cities such as Columbus, Toledo, Cleveland and others, we have a great deal of underground work. It is necessary to build a vault at what is known as a manhole along the streets. This shows the splicing of a 900 pair cable, and the operation is similar to that on aerial, but more complicated, because of the greater number of wires. This is also covered in specification Number 3912, the method of splicing.

Now the manhole which is shown in this photograph, the construction of that is shown in the specification on underground construction 3613. It will be interesting to refer back to photograph Number 27, and there you will see a completed splice in a manhole. That is, after the splice is [fol. 8711] made and the plumbers' joint wiped. This manhole can be filled with water and that cable should not develop any trouble if work is properly done in accordance with the specifications for splicing.

That also shows a method of supporting cables in the manholes, so as to prolong their life, and the formation of cables, item F there, is a cable stub. That is interesting, since the branches which connect with the splice—sometimes there are a great many in one manhole, and it is desirable to do that work not in the main splice but at the end of this stub which is shown at the top of this. Now the development of that stub is also an item which the A. T. & T. Company has developed. Formerly all of the

branches would go into the main splice and everytime you wanted to get a new cable, you would have to blow the joint, as they call it, and the effects of opening that main splice more than once or twice are rather harmful. This not only saves expenses, but it helps the life of the cable.

Q. That is, the stub splice does?

A. The use of the stub. Specification Number 4032 illustrates the method of placing underground cables which might apply to this photograph.

Photograph 29 is interesting. It shows a toll line. I want to call your attention to the brackets that appear on each side of the pole, about half way between the pole and the end of the arm. Those are phantom brackets, and what made phantoming possible was the proper bal- [fol. 8712] ance of the wires in order to quiet the wires from any inductive disturbances. Now there on this pole I can see at least eight phantoms there or a possible ten. It means if the phantoms had not been developed, it would have been necessary to add two more of those cross arms or bars in order to supply the space for the additional wires, if wires had to replace the phantoms. In other words, if phantoms had not been developed there would have had to have been a taller and a heavier pole, to get the capacity of the line.

Q. What company developed the phantom circuits?

A. The A. T. & T. Mr. Rhodes described that particularly. This open wire construction outside of this phantom feature is shown in specification Number 3928.

I have just one more that I think might be of interest. Number 31 shows the application of loading coils to a toll cable. Loading coils are also used on trunk cables, but in those cases they are mostly underground, and to get a good picture of a loading coil I had to take this picture of a toll cable in the vicinity of Cleveland.

The next picture is of more interest. It shows toll cable between Cleveland and Akron. It is a cable that has 56 quads in it besides 138 physical pairs.

In the first place if a quadded cable had not been devised, in order to get the same capacity a second cable would have been necessary, and for this distance of about 35 miles between terminal points, between Akron and Cleveland—This cable cost about $500,000.00—an addi- [fol. 8713] tional cable would have cost probably at least

half that. That is the feature of quadding. The feature of loading would not have made it possible to use a cable between Akron and Cleveland.

Q. You say the feature of loading would not have made it possible?

A. No. In order to get these circuits, it would have been necessary to have applied—to have taken care of that capacity by means of open wire, copper wire. To have built a pole line carrying that number of pairs, just the physical pairs only, would have required a pole of the height to take 23 arms, and the lowest about 18 feet from the ground. You can imagine about what kind of a pole that would be. Something like the one Mr. Rhodes showed us as an obsolete pole in New York. Such a pole would be entirely impracticable between Cleveland and Akron or any other place in Ohio on account of storms and so forth, and I doubt whether we could get the material for poles of that height. Furthermore, the other wires that we had to cross over and under would have made such a height of line entirely impracticable. Now to build a practicable line carrying this same capacity would have required three pole lines of 10 arms each.

On photograph Number 30 you see a pole line of six arms. That is a very heavy pole line. With ten arms you would have four more arms, and that we consider the maximum practical height pole size line to build for open wire. Now we would have had to have built two more such lines to provide for these circuits and reasonable growth. Only one line would be built on a highway. The other side is usually [fol. 8714] reserved for electric light companies.

Q. When was this line built?

A. This cable was placed about six years ago.

Q. Yes, that is the Cleveland-Akron cable?

A. Yes, sir. We would have to either use three pole lines or buy a strip of right of way 30 to 50 feet wide in order to build this open wire feed to give us facilities of that kind.

Mr. Gentsch: Have you bought any rights of way of that kind?

The Witness: No, sir.

Mr. Burr: They adopted the suggestions of the American Company instead.

Mr. Dotson: Is this method you have just described here in photograph 32 the usual standard method loading the aerial of the company?

The Witness: Yes, sir, we have instructions in various forms. In this particular case it is not covered by a particular specification, but this transmission equivalent bulletin which I put in as an exhibit goes into this rather in detail and shows the application of loading coils to toll cables as well as other telephone plants.

Q. You say this is in the vicinity of Cleveland?

A. Yes, this is from Cleveland to Akron.

Mr. Snook: Is it your usual practice to put it above or below ground?

The Witness: Years ago we used to place these coils, [fol. 8715] these pots containing the coils, underground, but we have found there are many locations where the sightliness is not an important factor. This happened to be near the garbage disposal plant just south of Cleveland and we get satisfactory construction by placing these in the air. They are more accessible in case of difficulties and we save the cost of the manhole besides the additional cable required to go into the manhole and back, since this is a high-grade cable and all the surplus material we can save in that helps our transmission.

Q. I believe you mentioned in your testimony that you are in constant touch with the general staff with the American Company on any questions that arise in your work. I think you also mention that you have taken up many matters through correspondence and telephone conversations and so forth. Now since about the year 1921, for example, down to the present time, how many letters have you received from the American Company in connection with the work of your department?

A. I have 1720 letters that we have received from them in response to requests, *or* a few of these letters were of course general letters. 86 per cent. of these were in connection with specific problems in response to our requests and only 13½ per cent. about were general letters of the character that applied not only to Bell, but also to other companies.

Q. When you speak of the letters received from them to whom do you refer?

A. The A. T. and T. Company.

Q. What part of the A. T. and T. Company?

[fol. 8716] A. All departments.

Q. You mean departments of the General Staff?

A. Yes, sir.

Q. Have you a list showing the letters received and also telephone conversations on these various matters during the period covered by your previous answer?

A. Yes, it was rather difficult to get a complete list of telephone conversations, but I found 235 in the last two or three years.

Mr. Burr: The partial statement may be marked Kositzky Exhibit Number 26 and is offered in evidence.

And thereupon the list above referred to was marked for the purposes of identification and was offered and admitted in evidence on behalf of the Ohio Bell Telephone Company and is herewith submitted marked Kositzky Exhibit Number 26 and made a part hereof.

Commissioner Maullar: This correspondence covers what period?

The Witness: Since the formation of the Ohio Bell, about October, 1920. There were two Ohio Bells. The Cleveland Company changed its name to Ohio Bell in 1920, and then the present corporation was formed in 1921. This dates back to the latter part of 1920.

Mr. Dotson: Do you know how many of these communications related to local problems in Cleveland.

The Witness: In Cleveland?

[fol. 8717] Mr. Dotson: Yes.

The Witness: Oh, I can't answer that.

Mr. Dotson: Quite a number.

The Witness: Oh, yes, most of these are local problems in various cities in the state, not necessarily Cleveland, but Toledo, Columbus and other cities and I think also toll problems.

Mr. Dotson: What you call relating to the local problems, you mean that the communications themselves bear on the face of them the particular locality to which they refer?

The Witness: I will be very glad to give you an example I have in mind now of Toledo.

Mr. Dotson: Yes.

The Witness: About two years ago, the question came up of the enlargement of our Toledo Dorr Street office. We

made a study. My department made a study. We had a number of questions in connection with that which seemed to us that we had to choose between, and in this particular case I got in touch with the proper party in New York, and they not only wrote us, but sent a representative to Cleveland, and we went over this Toledo problem and decided to extend our building, which has since been completed by Bentley and Sons, and we have installed equipment in that building.

I might state that the Ohio State has also a building on that street. The question was, shall we continue both? Shall we replace one or the other? Or shall we build a new [fol. 8718] one? It was a difficult one. We decided after a conference to add to the building, as we have done since.

Mr. Dotson: That is one of the branch exchanges.

The Witness: Yes. Another one I had recently—This is a telephone conversation—in connection with the purchase of that new piece of property just south, I think it is, or west of the present Ohio State building in the Spitzer Building. We could not very well write a question of real estate; it is a rather delicate question which you must handle verbally. I got in touch with the proper people in New York and they sanctioned or agreed to our proposition of purchasing that particular piece of property.

Mr. Dotson: These proposed alterations of branch exchanges you spoke of in Toledo, you consulted with the A. T. and T. Company primarily because it is the owner of the Ohio Bell, interested as such in the changes and alterations and improvements made in Toledo as well as elsewhere.

The Witness: No, not necessarily, Mr. Dotson. That is just one point that I wanted to bring out, that we do not always agree with their suggestions. Whether we are right or wrong remains to be seen. But they have had so much more experience in the building of central office buildings, particularly main offices as in this case at Toledo, or I hope it will be soon, that we felt it safer to ask them if a lot 150 feet wide by 120 feet deep, which is peculiar to Toledo, [fol. 8719] where it is hard to find property deeper than that—but we had a real problem there with which we felt much safer with their advice.

Mr. Dotson: My question is directed to the case you describe of consulting the A. T. and T. Company about the

question whether to build an addition to one of the branch exchanges or whether to build a new one I believe if I understood you and dispense with the two existing ones.

The Witness: We had three problems. We could continue the two buildings and postpone for a time the addition to one of the buildings or——

Mr. Dotson: That arose since you purchased the Ohio State.

The Witness: Yes, sir.

Mr. Dotson: You are dispensing with one of those branch exchanges then?

The Witness: That is right, yes, sir.

Mr. Dotson: That is out on Fernwood Avenue?

The Witness: Near Door street.

Q. Could you give some specific examples of the questions which were referred to in the correspondence referred to in Exhibit 26?

A. I have a few I thought might be of interest. There is one pertaining to Columbus. On April 22nd of 1922 the A. T. and T. replied to our request as to the arrangement of the Columbus Commercial office. Prior to that date we had our commercial office at 33 North Third Street, which was the old Bell Building, but with the acquisition of and [fol. 8720] consolidation with the Ohio State, we had to enlarge our quarters. The A. T. and T. Company specialists, who have studied commercial offices, in large cities, advised us, worked with us, and we have adopted here in Columbus what they call the unit type system of commercial office, and I think that any of you gentlemen that have seen that office will say it is a very handsome office, not only handsome but convenient and practicable and has great improvements over the old arrangement we had at 33 North Third.

Q. Are there any others that you can mention?

A. Yes, there are a few others. We have had considerable correspondence with New York and also they have sent representatives to Ohio from time to time in connection with population estimates. I think this is of interest. I am sorry I did not have some copies of Bulletin Number 47, in which they have made a study of the population not only of the United States, but the States in the United States. We have some figures that might be of interest, Mr. Burr. They estimate in this circular that the United States will

have a population in 1930 of 119,200,000 people, in 1940, 134,000,000 people. In 1950, 150,000,000 people.

Now they have also made a forecast in this bulletin of the population of the various states, and I might give you Ohio, as that is of interest. In 1930, a population of 6,722,000; in 1940 7,762,000; in 1950, 8,860,000. This shows a consistent gain of about 1.6 per cent a year, or 16 per cent per each [fol. 8721] ten years, and that is considerably more than what they estimate for the population of the United States.

My curiosity was a little aroused and I went through all of these and found that there are only four states in this union which have a growth exceeding Ohio. Two of them are just a trifle more, and New Jersey and California have a growth of a little over two per cent per year or 25 per cent per ten years. Arizona and Michigan will show just a little more than Ohio. In all the other states the annual growth is less than Ohio. I can get copies of this if it is of interest. I only have one copy. That is really important facts.

Now the population forecasts of the cities in Ohio are made very largely by the Ohio Bell, but they are supervised by the A. T. and T. Company. On the first one or two made they spent a great deal of time; in fact they sent their representatives to Ohio and spent a great deal of time in Ohio.

Q. What is the purpose of these forecasts and what reference have they to the telephone business?

A. In order to build our telephone plant we look toward the future. When we locate a central office we must know that that location is not only right to-day, but will be right in the future, as an office cannot be very easily moved.

Q. What do you mean by that?

A. So far as the wire center is concerned, it will be about [fol. 8722] the center of distribution in the locality which that office will serve. The conduits built underground for a long period of years in advance must also be designed for a certain number of cables, and that can be converted to terms of telephone stations. We know how many stations a pair of cable and about how many pairs per cable. So that the permanent construction must be built along some permanent line.

To start that work it is first necessary to make a population estimate not only by cities but by localities within the city. Upon that we make a commercial survey, which will tell us the number of telephones in the future by classes,

party lines and direct lines, business and residence, extension stations and so forth for these various locations. With that information we can then proceed to design our ultimate office, locate it first, design it, with the proper number of ducts underground, design the trunks to connect these future offices, and so forth, so that when any work is done we have an ultimate picture toward which to build. We made such a survey and population estimate for Columbus, and one letter which we received was November 20th, 1922, in which they commented upon our study on a population estimate made for Columbus. If it would be of any interest, I can tell you what this population estimate was. It showed that for 1940 Columbus would have a population within the present city limits of 304,554, and in the area which we call Columbus Exchange a little over 400,000.

Mr. Dotson: When is that? 1940?

[fol. 8723] The Witness: Yes, that is the period for which the study was made. We have intermediate points also.

Mr. Dotson: Who made that study?

The Witness: That was made primarily by the Ohio Bell. We furnished the clerical help, but the A. T. and T. Company have had their specialists in on these studies and were in touch with them while they were being made. I will give you some figures later of the number of times they sent people to Ohio on these various studies if you care to have them.

On March 7th, 1923, they wrote us in connection with the centralization of directory compilation. I thought that might be of interest since prior to this date our directory compilation work was done in the various exchanges throughout the State. They have experts who have studies not only the method of preparation of directory, but the methods of keeping the directories up-to-date and so on. Following their advice, we centralized this work and we saved $20,000.00 a year in Ohio on that one little item alone. In 1923, April 3rd, they wrote us in connection with the Cleveland Commercial Survey. We also made a population estimate and commercial survey of Cleveland.

Mr. McConnaughey: Mr. Kositzky, who was the fellow that devised the type in these directories? I would like to get a hold of him.

The Witness: I would be glad to have you see him, because we get a great many favorable comments on our direc-

[fol. 8724] tories, and I have some samples here of the old and new.

Mr. McConnaughey: It is the only type I can't read.

The Witness: On the Cleveland Commercial survey it showed that in 1940 we would have a population within the city limits of Cleveland of 1,068,360, or in the exchange area of Cleveland a little over 1,600,000. We received a great many other letters. On November 9th, 1923, in connection with the method of compiling directories again. January 11th, 1924, handling discounted accounts where the balances were due. Those are mostly commercial. I have a few here on plant engineering. For instance on October 8, 1921 they wrote us in connection with the addition to central office equipment at Alliance and Washington Court House.

Mr. Dotson: I am interested to know to what extent you have slandered Toledo on the question of population.

A. We made a study of Toledo. This was made in 1920. Our engineers, in conjunction with the A. T. and T., estimated that Toledo within the city limits will have a population of 311,000 and the exchange, which takes in the territory which is adjacent, 450,000 in 1940.

On January 12, 1922, we received a letter from the A. T. and T. Company in response to our request on the question of stubbing of cables. I showed that picture which indicates the application of the stubbing principle. And on this particular date, they advised us in connection with the stubbing of these particular cables.

[fol. 8725] On March 28, 1922 they also replied, in response to our request in connection with a suitable truck body to use on telephone trucks. We had a number of questions in connection with railroad P. B. X's. Alliance was one. When we changed from manual to automatic the question of giving service to the Pennsylvania companies P. B. X. was one that was difficult. We wrote the A. T. and T. Company and they advised us how to handle and connect that switchboard without replacing it to the new Alliance Exchange. Then we wrote them and received a reply on October 11th, 1922, in connection with air compressor and compressed air tools. In changing from manual to machine switching we had quite a problem in connection with converting the P. B. X. switchboards to work with this new type of equipment. The Pennsylvania was one specific problem.

We had problems of a minor nature in connection with

every other point. It either meant modifying the boards or installing new ones. They gave us considerable assistance by which we could continue the boards with slight modifications to work under the new conditions. That would apply to such a board as the Pennsylvania board at Alliance, which is just one example. The Union Trust recently installed quite an elaborate private branch exchange of the automatic type, and that was a rather unusual installation, and we wrote them and they replied on January 13th, 1923, giving us suggestions on that.

The A. T. and T. have done a great deal of work on labor [fol. 8726] saving devices, which Mr. Rhodes testified to, and we have been adopting those wherever we thought we could justify them in connection with our work.

The new boring machine, and pole derrick was the one that seemed to offer quite a saving to the company. So we wrote them. They replied to our letter as to the application of that in Ohio, and we have since purchased such a tool and are now using it. I have some photographs here which show this particular labor saving device. The first figure shows the machine and the four men necessary to operate. In the rear there you will see the augur mounted just in the rear of the rear wheels, and the upright immediately above the augur not only holds the machine to raise and lower the augur, in other words, forces it down, but is also used as a derrick in hoisting the pole.

Mr. Burr: The two photographs showing the boring machine may be marked Kositzky's Exhibit Number 27 and it is offered in evidence.

And thereupon the photographs above referred were marked for the purposes of identification and were offered and admitted in evidence on behalf of the Ohio Bell Telephone Company and are herewith submitted, marked Kositzky's Exhibit Number 27 and made a part hereof.

The Witness: The second photographs shows this gang actually at work. The second photograph shows the truck [fol. 8727] just after having bored the hole, which only took a few minutes, and is lowering the pole into the hole. The work that this truck and these four men will do under the old method required 30 men and one truck. These four men now do the same work, or a saving of 26 men a day, and if it is country work, besides their board and lodging expense.

This machine was developed by the A. T. and T. Company.

Mr. Dotson: Does that also effect a saving, a corresponding saving in cost of placing poles?

The Witness: Oh, yes, they are able to erect poles at less cost now than under the method of handling labor at the current prices.

Mr. Shuler: Mr. Kositzky in your method of arriving at reproduction new, do you figure the construction of the pole lines by the use of this machine?

The Witness: We take into consideration all factors as I would——

Mr. Shuler: No, answer my question.

The Witness: If we are going to reproduce Cleveland——

Mr. Shuler: No, have you done it in your reproduction new.

The Witness: We haven't any units yet, but I will just tell you how we will prepare them if that will be responsive to your question.

Mr. Shuler: No, it would not. No, I wanted the fact whether in this toll line case, in the construction new of that plant, you have arrived at your cost by using the old 30 men and the truck or the use of the machine.

[fol. 8728] The Witness: 30 men and a truck, because that is the way the present plant is built, and this will only apply to future construction.

Mr. Snook: Mr. Kositzky, just for the purpose of my own information, and it need not go in the record, would you retamp the dirt, how is that done?

Commissioner Poor: It probably better be in the record.

The Witness: There is a gang of 6 men who follow the job.

Mr. Snook: They line up the pole and tamp the dirt.

The Witness: Yes, under the old method and the new method.

Mr. Snook: Do you know what the difference in cost of construction is between the old method and the new.

The Witness: We have not had the experience, having only had a few months; we hope to know how much we will be able to save per pole for every hole dug.

Mr. Shuler: You know it saves the labor and boare of 26 men per day.

The Witness: Yes, sir, or the 75 poles that it will set per day. On October 18th, 1923, the A. T. & T. wrote us in

connection with our fundamental plan which we have recently completed for Cleveland. On December 11th, 1923, they wrote us in connection with the problems we encountered in Youngstown in connection with the installation [fol. 8729] of the new equipment just completed. Mr. Anthony covered the traffic questions and I will pass them over.

Q. You said something about the advantage obtained through the telephone conversations you had with the staff of the American Company in New York. Can you give us an example of some of the questions concerning which you have found it necessary to consult with the General Staff by long distance.

A. I can only give my own experience, Mr. Burr.

Mr. Dotson: Now this is to relate conversations by telephone.

Mr. Burr: No, he is just giving examples of instances wherein he was required or found it desirable to take up matters with the General Staff by telephone rather than by correspondence.

The Witness: I mentioned one case and that was the Toledo lot which we purchased, which we could not very well write, and I have one or two others in my own experience that might be of interest. In 1922, early in 1922, when we had this problem of unification, unification work, in Ohio, we realized it was a tremendous job, and I got in touch with Mr. Charles Wolfe, plant engineer, for the General Staff of the A. T. & T. Company in New York about the loan of some people either from his own organization, if they were available, or to obtain men for me from other companies. As the result of this conversation I got a man about as quickly as the man could conveniently arrange to come to Cleveland, and he assisted me in some equipment engineering work. This man's name [fol. 8730] was Wright.

Mr. Dotson: What was the conversation you had concerning the Toledo lot?

The Witness: Merely this, that we had a piece of property—there was a piece of property in Toledo of a certain size and an approximate location—he had a map of Toledo —that we thought favorably of purchasing in connection

with our future home as a main office in Toledo. We asked him—I cannot remember the details, but this is in general—as to whether or not he felt that an interior lot of these dimensions would give us a building of suitable depth and width and also with suitable light and air to house equipment. It was not considered at this time for offices, because you can put offices in any building and have them satisfactory. But in connection with equipment, the building must be designed particularly for the equipment, not only for arrangements so as to have an economical arrangement in a certain space but to provide for the expansion and growth in the future.

Mr. Dotson: Prior to that conversation though you had worked out a fundamental plan for Toledo, including such a building as you contemplate.

The Witness: The fundamental plan is only for the purpose of locating a center which would be suitable. That center was very close to the place where we purchased this property, but the fundamental plan does not design the building. It merely gives us the location and the number of stations that will have to be accommodated at that [fol. 8731] point at some period hence.

Mr. Dotson: You had assured yourself, you were satisfied in your own mind, that the location you had under consideration was a suitable one before you communicated with them.

The Witness: I was satisfied that the location was as good as could be had. It was merely a question to see what his idea was and whether or not the shape and size were satisfactory.

Q. State some other recent cases?

A. One interesting one that happened recently in Ohio was where the local light company changed its method of distribution from the three wire three phase to a four wire distribution, and it caused us some trouble. It was entirely new to us, I knew nothing about the advancement in electric light distribution, so I called up the General Staff and they sent a man to Ohio, not only to Cleveland but to this particular locality where we experienced this trouble, and worked with the light company, and they solved our difficulties, and so far as I know the light companies are following—at least there was a solution worked out between the two which solved our problem.

Q. I think you have already referred to the assistance given you by the General Staff in connection with the electrification of the Detroit, Toledo and Ironton Railroad. Is there anything else that you have to say on that particular subject, or did you cover it in full?

A. No, nothing only we have Order 65, now 72, of the [fol. 8732] Commission which quite generally covers the standards to be employed in the electrification of a railroad. Yet we have a great deal of property involved, not only toll property, but exchange property, which will be seriously affected by the introduction of high tension circuits along the railroads in connection with the electrification work.

Q. Are these the only matters of this kind that you could cite?

A. Oh, no, there are many others. These are just some that I jotted down as being probably interesting examples.

Q. In one or two parts of your testimony you have referred to special services rendered. Do you refer to services in addition to correspondence and telephone conversations?

A. Yes. The other list of services is really one that is of considerable interest, in that it cannot be handled very conveniently through correspondence or telephone conversations, services where they come out and actually assist or confer with us, or we go to New York and get information there. We have had quite a number of instances of special service of this character that we have received in the past few years, at least since the formation of the Ohio Bell. I have a list of 577 instances.

Q. Of what?

A. Of such services, where either the A. T. & T. people sent people to Ohio or we sent people to New York, mostly the former.

Q. All but two and one half per cent of these cases were specific services in response to our request. The other two and a half were more or less of a general nature which [fol. 8733] was given to all associated companies.

Mr. Burr: The list may be marked Kositzky Exhibit Number 28 and is offered in evidence.

And thereupon the list above referred to was marked for the purposes of identification and was offered and admitted in evidence on behalf of The Ohio Bell Telephone

Company and is herewith submitted marked Kositzky Exhibit Number 28 and made a part hereof.

Q. Just state in your own way if you please a few typical cases of those services?

A. I did mention the unification work. They have sent people to Ohio from time to time. At one time alone they had five men and spent a week here. These five men were experts in the five different lines. They visited the various cities in Ohio and they discussed with us on the job our program or plan that we had for unifying of the services at those various points.

Q. Was there any special circuit work at any of the points?

A. Yes, that was another service I would like to mention. In the larger cities such as Cleveland, Toledo, Columbus, Youngstown, Akron and others a large amount of special circuit design and development work was necessary to unify the boards, in other words, to make it possible to transfer calls from one switchboard of one make to switchboards of another make. In Cleveland alone 90 special circuits were developed, telephone circuits, *telephone cir-* [fol. 8734] *cuits*, and 16 power circuits; Toledo 60 telephone circuits and 12 power circuits.

Q. What do you mean by circuits?

A. A circuit is a grouping of apparatus and wire in order to perform a certain function required in connection with the telephone conversation. There are thousands of circuits in a switchboard.

Q. You mean thousands of different kinds?

A. Yes, sir. In Barberton, which seemed rather a simple case, yet in order to make the switchboard, which is of a make other than Western Electric, work with the switchboard at Akron, it was necessary there to design 23 special circuits; about the same number in Cuyahoga Falls to make that work with Akron. There are a number of others, Springfield, Columbus and Dayton.

Mr. Gentsch: Do you mean to infer from your testimony here without the help of the Ohio Bell you did not have competent men to do this work.

Mr. Dotson: Without the help of the A. T. & T.

Mr. Gentsch: Without the A. T. & T.

The Witness: No, I do not, but I do mean this, that in order to have developed these circuits it would have been

necessary to have employed additional help. It would have taken considerably more time and probably have cost us considerably more to do the experimental work necessary, which these men from their experience could direct us to almost without any false motion.

Mr. Gentsch: Aren't a lot of you men doing that work [fol. 8735] constantly who are familiar with that.

The Witness: I have circuit men that work on smaller jobs, and where once this man has had instructions as to how to handle a particular problem, all such problems are then handled by this particular man.

Mr. Gentsch: Aren't these problems all of them more or less a repetition of the others?

The Witness: Each of these is a different problem.

Mr. Gentsch: All varying in detail, but along the general line——

The Witness: They are all different problems.

Mr. Gentsch: You mean that, notwithstanding all the work, that your organization has done you haven't anybody competent to do it without the help of the A. T. & T.

The Witness: I think I answered that.

Mr. Gentsch: Is that what you mean?

The Witness: I think I answered that.

Mr. Gentsch: Just answer that yes or no.

The Witness: Not entirely.

Mr. Gentsch: All right.

The Witness: Now they spent on these few jobs 49 man days, or one man 49 days, or 7 men 7 days whichever way you want to take it. Now when the commercial survey was made in Cleveland, which was a rather special problem on account of its size, they had three men in Cleveland, who spent altogether 1118 man days or the equivalent of one man nearly four years. Now these men worked with our [fol. 8736] people. There were a great many men involved in this study.

Q. Did you speak about the instance in June 1922, when a number of American Company experts from New York visited Toledo, Cleveland, Columbus, Dayton and Akron?

A. I believe I mentioned where five men, specialists, spent a week in Ohio.

Q. Yes?

A. We made a commercial survey also of Columbus, and altogether they helped us to the extent of over 3,000 man

days in the commercial surveys made in Cleveland, Columbus, Akron, Toledo and Youngstown.

Mr. McConnaughey: Now that job is done for 20 years isn't it?

The Witness: No, these are checked from time to time as conditions change. Every five years or thereabouts. In Cleveland we just finished one. The one before that was in 1916. The one before that I think was about 1910 or '11, depending on the growth of course. A city that has a remarkable growth, it is necessary to check it up oftener, and one that is stationary we do not check up so often. They are about to make one in Dayton for your information.

Q. Briefly of what do the commercial surveys consist?

A. I thought I covered that. Mr. Rhodes covered it.

Q. Yes, he did. I don't know that it is necessary to go into that again.

A. After a commercial survey is made, a fundamental plan is made which I briefly described, and A. T. and T. have specialists who do nothing but that. We have made [fol. 8737] such fundamental plans of these cities mentioned, and they have sent men to Ohio. I have found altogether spent 137 man days in fundamental plan work, that is, in addition to the commercial survey.

Mr. Gentsch: Did any of those men spend any time on the improvement of the service.

The Witness: Not these fundamental plan men.

Mr. Gentsch: I mean any of these experts.

The Witness: Yes, sir, we have service experts whom we consult. I would like to mention Mr. Harrison who is an equipment maintenance specialist, what we call a bug shooter.

Mr. Gentsch: Why is the service as bad as it is in Cleveland?

Mr. Burr: I object, that is not a fair question.

Mr. Gentsch: He knows what it is and you do not.

Mr. Burr: I do not know that the service in Cleveland is bad.

Mr. Gentsch: You are the only man in Cleveland that does not know it.

Mr. Dotson: He is not in Cleveland.

The Witness: I thought the service was good in Cleveland.

Mr. Gentsch: I pity your judgment then.

Mr. Miller: Has any of the General Staff been to Canton?

The Witness: Yes.

[fol. 8738] Mr. Miller: I mean on improving the service.

The Witness: Mr. Farnum, a traffic engineer for the A. T. and T. Company was there about three months ago. Mr. Roberts, equipment engineer, and another gentleman whom I met, together with other Ohio Bell officials, spent a day and some two days in Canton.

Mr. Miller: They didn't accomplish much, did they?

The Witness: I don't know. Another study that was made was what we call loop and trunk study, the proper balance you might say between the balancing of the trunk conductors between various offices and the subscriber's loop, in order to design and arrange the most economical plant to give what we call standard transmission. Such studies have been made for Cleveland and all the larger cities in Ohio. The Cleveland one is interesting. That was about the first one. The A. T. and T. helped us considerably. In fact about 23 man days their experts spent in Cleveland on this particular study. It showed that by a little different assignment and arrangement of apparatus, substation apparatus, and the loading of trunk conductors and changing the details of some of the various offices we were able in the next five years to economize in plant construction to the extent of $500,000.00. I might say that most of this would apply to the Ohio State plant. The Ohio Bell had some kind of loop and trunk study work before. But this was merely to check up, to embody the newer de-[fol. 8739] vices or methods developed by the A. T. and T. Company. The Ohio State had no such assistance from A. T. and T. or such experience, and we found that their plant was designed and arranged very uneconomically. In many cases plants were improperly placed. The larger wires were used when not necessary, and too small conductors in other places.

Mr. Shuler: Were you familiar with the Ohio State in Cleveland at the time it was consolidated? Let me ask you this question. Was the fact that the Ohio State Company in Cleveland was uneconomically, wastefully and inefficiently equipped, considered by your company and so represented

to the Commission and effect given to that when a valuation was placed upon it for the purposes of consolidation.

The Witness: I do not believe that I could answer your question.

Mr. Shuler: Do you know who can? Do you know who, in your department, or the General Staff is familiar with it so that we can get it?

Mr. Burr: The record is the only place where you can find that. I was present at the hearing, but I have no recollection of that..

Mr. Shuler: You have no recollection?

Mr. Burr: No.

Mr. Shuler: You don't know whether that was considered or not?

Mr. Burr: I have no recollection on that subject at all. [fol. 8740] Mr. Shuler: You don't know whether it was represented as being 95 or 90 per cent efficient?

Mr. Burr: No, I do not.

Mr. Shuler: Do you, Mr. Schneider?

Mr. Schneider: No, I haven't any recollection now.

The Witness: The A. T. and T., if I may be permitted to continue, have experts who have studied the question of directories, the paper stock, cover stock, the arrangement of the listings, desirable type and so forth. These men have studied directories over the entire United States and have assisted us in our directory work. I have here some directories which might be of interest. Here is the old Ohio State directory issued in 1922 for Canton. This has 174 pages, and 8479 listings. The Bell directory about the same date, July 1922, has 190 pages, and 7,766 listings. The new directory for Canton, which is the consolidated directory, has 15,066 listings and only 113 pages, or less pages in this directory than in either one of the single directories, and I do not believe that comparing these directories there is any question but what the newer directory is not only easier to use, but easier to read. Now the savings in directories alone in 1922 over preceding years was $20,000.00. Here is the Xenia directories.

Mr. Shuler: Do you mean your books will show that you spent $20,000.00 less for directories?

The Witness: In the printing bill, yes, sir.

[fol. 8741] Mr. Dotson: Mr. Kositzky, those larger directories were used then more as advertising mediums than

that new one and those advertising revenues bore that expense?

The Witness: I did not include the advertising pages. I merely took the pages covering the listings.

Mr. Dotson: The portion for listings is greatly reduced by the marginal advertising, isn't that true?

The Witness: There may be something to that, although the new directory also has marginal advertising, and the revenue from advertising is even greater in the new book than in the old one.

Mr. Dotson: The other element that enters into the difference is the smaller type you are using now.

The Witness: The type is a little smaller, but it is a sort of bold face type which is easier to read. Before that type was adopted I saw some experimental work one time when I was in New York. They had various types, various sizes and they submitted them to a number of people, with the request as to which type was most easily read, and that is the way in which they arrived at the type that is now being used.

Mr. Gentsch: I know I can't read it. I use to read the old directory, but now I have to change my glasses.

[fol. 8742] Q. Now, referring a moment to the 1922 loop and trunk study for the City of Cleveland, what, if any, was the total saving over the five year period resulting from that?

A. I think I answered. I think that is in the record.

Q. I am not sure.

A. $500,000.00 would be the savings, the savings in the next five years in construction of plant.

Q. I think you did refer to that, but my attention was called elsewhere for the moment.

Mr. Gentsch: Has that been given any effect in your reproduction value?

The Witness: That is the same question as your pole question. The inventory must bear that out, and five years from now, while inventorying this property as then, if there is that much less property, then it will be that much less in dollars.

Mr. Gentsch: Do you expect to inventory again in five years? Is that your idea?

The Witness: I cannot answer that.

Mr. Gentsch: Is it reflected or in any way given effect in any figures you have given the Commission?

The Witness: No, those savings have not yet been realized.

Mr. Gentsch: But your rates that you are asking for are affecting the future when these savings will be in effect; that is true, isn't it?

The Witness: I have quite a list more of savings. It will [fol. 8743] probably be easier to answer it when I have all of them.

Mr. Gentsch: Yes.

The Witness: I cannot answer that question. That is a legal question.

Q. What are some more of the services of a similar character?

A. There are a number of others. The rearrangement of the Cleveland offices and the installation of busy test cabinets, joint use of poles in residential blocks, standardization of booths, revision of our routine, transmission complaint reports, estimate routines, routines for handling power cases and cooperation with power companies.

Q. Are these all matters as to which your company had the assistance and advice of the General Staff?

A. Yes, sir. I might mention, in connection with that, Administrative Order No. 72, on which we received help from Mr. Wilkinson, Keyes and others. These men spent a total of 201 days in the preparation of these rules in Ohio.

Q. That was done at the invitation of The Public Utilities Commission, wasn't it?

A. Yes, sir.

Q. All right. Go ahead. No, just a moment. Before you get off of that, who paid for the time of those men and the expense while they were working on that matter, do you know?

A. The A. T. & T. Company.

Q. Go ahead.

A. We had some difficulties here in Columbus which were heard before the Federal Judge and also this Commission in connection with the power over building on the Johnstown Pike between Columbus and Gahanna and other [fol. 8744] places. In connection with that controversy the A. T. & T., at our request, sent a number of employes, Mr. Wilkinson, Keyes, Norris, Moore and Sghirmer, to Ohio,

who altogether spent 52 days here in Columbus in connection with these various cases before this Commission and the Court.

Mr. Shuler: That is not an expense matter.

The Witness: It is a service we received in connection with this difficulty we had which we were not so fully equipped to handle.

Mr. Gentsch: Your situation after you got through was no different than when you started on that.

The Witness: We arrived at a solution.

Mr. Gentsch: Yes, but it was not the solution the A. T. & T. wanted, was it, or you wanted?

Mr. Burr: Oh, yes, it was.

The Witness: I don't know why not; we agreed to the solution. It was settled out of Court.

Mr. Gentsch: But isn't it a fact that the settlement was along the lines of the Power Company's contention and not your lines? You gave it to them and you had to concede they were right?

The Witness: No, sir.

Mr. Burr: Not at all.

The Witness: No, sir; the concessions I think were something on each side.

Q. Do you remember how much the Power Company paid your Company?

A. No, I do not.

Q. But it was something, wasn't it?

A. Oh, yes.

[fol. 8745] Commissioner Maullar: And the lines were to be separated in accordance——

Mr. Burr: In accordance with the suggestions of the Telephone Company made pursuant to Order No. 72.

The Witness: Another item of special service we received was in connection with machine switching or, automatic service in different cities. The A. T. & T. had experts and specialists who were thoroughly conversant and familiar with the engineering and design and operation of this apparatus. We sent people to New York and they also sent people here who gave our employes instructions in connection with the engineering of this equipment. This is commercial information, traffic instructions and equipment instructions, altogether about 535 man days, if I may use that

expression, consumed by the men from New York in connection with this educational work.

Q. That is time spent in Ohio and in New York?

A. Yes, sir.

Q. Time spent in Ohio by the representatives of the General Staff of the American Company, and in New York by representatives of your Company?

A. Yes, sir. Throughout Ohio the electric light companies are engaged in building super-power lines, electric light lines of very high voltage. In order that we may be thoroughly familiar with the effects of this current in the vicinity of our lines and to know the remedial measures to apply, the New York organization conducted schools to which we sent employes to familiarize themselves with the technical details of this work.

[fol. 8746] To one school we sent three men to New York for three months, two sessions of three months each. Another school on inductive interference we sent seven men, or rather eight men, eight months each, or a total of 750 man days spent in New York by our people in connection with this educational work.

Mr. Dotson: At whose expense were they entertained there?

The Witness: Our employes in going to New York pay their own expenses and the A. T. & T. coming to Ohio pay their own expenses.

Mr. Dotson: Then in what way are we to understand that the A. T. & T. rendered service here for the Ohio Bell if the time of that service was paid for by those men?

The Witness: It is the educational service we received from their specialists in educating our employes.

Q. None of the services were paid for?

A. It is just merely the traveling expenses I refer to in answer to your question.

Q. Did you say anything about the transmission school?

A. Yes, sir, that was included in the inductive interference.

Mr. Dotson: When did this take place? When were these men down there?

The Witness: The last school, the last session, was about September and October of last year. The first session was in the spring. The transmission school was the year before [fol. 8747] that, or two years, somewhere along there. It

is all in the last three or four years. The A. T. & T. on various occasions have sent men to Ohio in order not only to take up matters directly with the specialists but also others who are interested in questions such as transmission—that is, not only the transmission engineering, but those that have to do with the maintenance of plant wherein transmission is an important factor. On several occasions they have sent men—one time five men—that held conferences with those supervisors in our organization and the conferences lasted several days, altogether about 30 days spent by the New York men in Ohio on those conferences. There are also other conferences we have right along. For instance, I attended one in May, '23, in connection with other chief engineers throughout the country, in which problems, current problems, were discussed, questions answered and the improvements and developments right up to the minute were given us.

Q. Now in the typical cases which you have pointed out what are the total results of the time spent in New York by men of your Company and by American Company's General Staff men in Ohio?

A. I haven't a list of all, but I endeavored to summarize a few I have mentioned.

I believe I left out one or two, but I had a list of something like 3586 man days in Ohio and 1344 man days in New York. That is only a partial list and does not mean much.

Q. You mentioned at various times the question of improv- [fol. 8748] ing transmission by means of loading coils, repeaters, etc. Can you tell the Commission what effect the addition of these improvements has had on the distance over which telephone users have been able to talk from time to time?

A. Yes, sir. Prior to the introduction of loading it was possible to talk only about 450 miles; that is, from Ohio you could talk to Chicago; to just a little beyond St. Louis, and, say, to Washington, New York and Buffalo; but the range of long distance conversation was rather limited. With the introduction of loading it is possible to extend the range of transmission to about 1200 miles; say a radius from Ohio covering points like Minneapolis, west to Omaha and Oklahoma City, below Atlanta and Montgomery to the South, as far east as Boston.

Q. Who evolved the system of loading to which you refer?

A. These were the coils Mr. Rhodes described as having

been designed, or rather patents controlled by the A. T. & T. Company. With the introduction of the repeater which came about in 1915——

Q. Who designed the repeater?

A. The A. T. & T. Company.

Q. Go ahead.

A. That made it possible to talk any place in the United States, to Cuba and even to points beyond the United States, such as into Canada, Mexico and so on.

I have a map here that shows rather interesting information that might be introduced showing the range of transmission.

[fol. 8749] We have a submarine cable from Havana to Key West, the longest of its kind in the world, and another between Los Angeles and Catalina Islands. That replaced formerly a commercial wireless station. You will notice this line constructed to Havana, routed to Washington, Chicago, Denver, San Francisco, Los Angeles and the Catalina Islands, 5500 miles in length, the longest physical line over which commercial service is given, at one point a mile below sea level and at another point west of Denver a mile above sea level.

Mr. Burr: It may be marked Kositzky Exhibit No. 29, and is offered in evidence.

And thereupon the map above referred to was marked for purposes of identification and was offered and admitted in evidence on behalf of The Ohio Bell Telephone Company and is herewith submitted, marked Kositzky's Exhibit No. 29 and made part hereof.

Mr. Dotson: What, if you know, did Mr. DeForrest have to do with the origin of the repeater apparatus?

The Witness: Only that he invented the bulbs and some of the tubes which are now controlled and the patent rights are available to the Bell System.

Mr. Dotson: He was not identified with the Bell System at the time?

The Witness: No, sir. Neither was Dr. Pupin who invented the application of the loading coil that is now in the posses-[fol. 8750] sion of the American Telephone & Telegraph Company.

Q. Both of those inventions were made available to the

Bell System through the efforts and the money of The American Company?

A. Yes, sir, and the application of those principles was strictly an A. T. & T. achievement.

Mr. Shuler: The Ohio Bell, as far as its long distance lines are concerned, are of what length?

The Witness: The Ohio Bell——

Mr. Shuler: Not over 250 miles?

The Witness: You mean within the State? It is from one corner to the other.

Mr. Shuler: They don't own anything outside of the State?

The Witness: I know, but the subscribers of the Ohio Bell are able to talk to any place in the United States.

Mr. Shuler: Now the repeaters and the loaders are most valuable to the long distance department of the A. T. & T.?

The Witness: No, the Ohio Bell has some, if I may answer it that way.

Mr. Dotson: Are those repeaters used by the Ohio Bell for their service within Ohio?

The Witness: Yes, sir.

Mr. Dotson: Is there any real need of that?

The Witness: Yes, sir; we have six repeaters; some here in Columbus; some at Akron.

[fol. 8751] Mr. Dotson: What makes the necessity for that?

The Witness: To talk from Middletown to Youngstown or from Dayton to the northeastern part of the State it is necessary for a repeater both at Columbus and at Akron through which these circuits are routed.

Mr. Shuler: Years ago, before your loader and repeater, I used to talk from Cincinnati to Cleveland and from Cincinnati to Ashtabula, didn't I?

The Witness: When was that?

Mr. Shuler: In 1904, '05 and '06?

The Witness: Yes, sir; that was this pink color; you talked over loaded circuits then.

Mr. Shuler: Just as you are talking now?

The Witness: Yes, sir; the loading was installed on open wire circuits in 1901.

Mr. Shuler: Oh, I thought this was later.

Mr. Burr: There is a distinct difference between loading and repeaters.

Mr. Shuler: Yes.

The Witness: The repeater makes you able to talk much further than the loading will.

And thereupon the further hearing of this matter was adjourned to ten o'clock Friday Morning, March 28th, 1924.

[fol. 8752] Friday Morning Session

March 28th, 1924.

And also G. A. Kositzky, resuming the stand for further direct-examination, continued his testimony as follows:

Examined by Mr. Burr:

Chairman Marshall: You may proceed.

Q. Mr. Kositzky, under whose supervision is the preparation of the program of plant extensions of The Ohio Bell Telephone Company, that is to say, the additions to plant, which will be needed from time to time, not only during the current year but in, let us say, for example, the next five years?

A. That is under my supervision.

Q. In preparation of the program, what, if any, estimate do you make and have you made for those additions to plant?

A. We prepare our estimate—I may first state that we make a very careful estimate of our station growth for the coming year, the amount of plant that is necessary to take care of that growth and the amount of expenditures necessary, the amount of money needed in order to take care of those expenditures. Now the expenditures necessary for the growth in the coming year 1924 are 11½ million dollars.

Q. Is that what you call a provisional estimate?

A. Yes, sir; sometimes called the budget or budget system.

[fol. 8753] Q. In addition to making a survey of the expected telephone growth what other elements have you taken into consideration in arriving at your provisional estimate for the year 1924?

A. The amount of money necessary to finance this program outside of the resources of the Ohio Bell.

Q. Tell the Commission whether such a provisional estimate is prepared each year?

A. Yes, sir, not only for the coming year but also for a period of five years hence.

Q. To what extent does that provisional estimate represent your judgment in the matter of the requirements of the Company for the next five years?

A. That is as accurately as we can estimate it and we think it is reasonably close; although our experience has shown that our requirements as we go along are a little greater than our estimates are of a year ago.

Mr. Shuler: May I ask the purpose of taking the time with this examination?

Mr. Burr: It bears upon the financial requirements of the Company and the financial services rendered to it by the contract.

Mr. Shuler: Oh, it comes in later? This is the foundation. I see.

Q. What have you estimated that your Company will spend for additions to plant in the year 1924?

A. $11,500,000.00.

Q. Is that what you call the requirements of your Company for the year?

A. Those are the gross requirements, yes, sir.

[fol. 8754] Q. And the amount is how much?

A. $11,500,000.00.

Q. What are your requirements for additions to plant in the next five years, starting with the year 1924 and ending with the year 1928?

A. $60,500,000.00.

Q. To what extent have you gone into the matter in order to arrive at that amount?

A. Well, as I explained, we make a very careful survey and estimate of the growth of telephone stations.

Q. You say you make or you made?

A. We make and have made for this period, and on the basis of that we compute our requirements of plant additions and then convert that into dollars.

Q. You spoke a moment ago about the results of your actual experience as compared to your provisional estimates; stating, I believe, that usually the actual experience in the matter of expenditures ran somewhat over the estimated amount. What was your experience in that respect with reference to the forecast of a year ago?

A. A year ago our five year estimate was $50,000,000.00, at the rate of $10,000,000.00 per year; that is, the year starting 1923; and our subsequent review, starting with the year 1924, indicated that our average per year would be a little over $12,000,000.00 a year, or $60,500,000.00.

Q. To what extent, if any, will the Ohio Bell Telephone Company require financial assistance in order to finance its 1924 construction program beyond the capacity or ability of its own resources?

Mr. Shuler: I object to the question. My objection is [fol. 8755] based on this, that all through the hearing they used any particular witness who happened to be present to prove any particular matter they wished to prove. What does this witness know what their financial ability is particularly to raise this particular fund itself? He is not in the financing end. He is an engineer.

Commissioner Poor: Well, he is supposed to be testifying from knowledge. If he don't know that, it can be made to appear on cross-examination.

Mr. Burr: It is his business to know these facts, Your Honor. He has already testified that it was necessary for him to make up the provisional estimates and he has made them up. The Commission say you may answer the question.

The Witness: Well, we will require for the year 1924 $3,882,000.00, outside of the resources of The Ohio Bell Company.

Q. From what source have you acquired a part of that amount, and from what source will you acquire the balance for the year 1924?

A. From the A. T. & T. Company.

Q. Do you know how much of that amount has already been furnished by the American Company for the year 1924?

A. Yes, sir.

Q. What is it?

A. 950,000 up——

Q. Dollars?

A. $950,000.00 up to Saturday, March 22nd.

Q. Do you know whether or not the American Company has agreed to furnish the balance of the amount during the year 1924?

A. Yes, sir, I do.

[fol. 8756] Q. Has it?

A. They have agreed, yes, sir.

Q. How much do you estimate The Ohio Bell Telephone Company will require beyond its own resources from the American Company for the years 1925, '26, '27 and '28?

Mr. Shuler: I object to the question.

The Witness: I should say in my estimation about——

Mr. Shuler: It can only be an estimated basis.

Mr. Burr: That is all it is.

Mr. Shuler: But then this year you have got it down apparently to a dead certainty because you are into this year. It seems to me we should not be bound by mere estimate which may change very materially. I cannot see the real materiality and significance of it, as far as it relates to the question we are discussing. I think the Company is permitted to go far enough when it is permitted to testify as to those matters for the year 1924. We might just as well have come in here with a laid out program for ten years and have adopted a ten year basis for study or discussion, or 20 years, and ask the privilege of prophesying to the extent of 20 years into the future.

Mr. Burr: It is certainly not unreasonable for the Company to estimate five years ahead in the matter of its plant additions and financial requirements. The experience of the Company has shown, as testified by the witness, that the requirements recently have run more than the estimates, so that when he gives his estimate it may be considered as a minimum requirement. It is certainly a perfectly competent matter for this witness to tell the Commission what are the [fol. 8757] financial requirements of this Company for the next five years, and I should think that the witness would be very much interested in it, as it goes to the amount which will be necessarily expended in the State of Ohio in the construction of additional plant to serve the people of this State, and it goes directly to the amount of financial assistance required by the Company under this contract, and the measure of the value of the financial assistance is one of the things which the Commission is seeking to ascertain in this case. It is not assistance for only one year; it is assistance for this year and a number of years in the future.

Commissioner Maullar: But the contract may be terminated by the American Company at any time they desire to.

Mr. Burr: No, it cannot.

Mr. Shuler: The license contract?

Mr. Burr: The license contract insures this right to the Ohio Bell Telephone Company in perpetuity unless the contract is terminated for the default of The Ohio Bell Telephone Company. I refer to Paragraph 14 of the contract, on page 18, wherein it says: "The rights of the licensee hereunder shall be perpetual unless sooner determined as herein provided, and the territory hereinabove referred to as the territory of the licensee is as follows, namely:"

Mr. Dotson: The termination of it is in the hands of the A. T. & T. Company.

[fol. 8758] Mr. Burr: For the default by The Ohio Bell Telephone Company in carrying out the terms of the contract on its part to be performed.

Mr. Dotson: They determine whether default has happened.

Mr. Laylin: On that point, Mr. Kositzky is undoubtedly an eminent engineer and as such is qualified to speak as an expert on engineering problems. However, in this particular instance—there has been no objection to his stating and projecting the requirements of expenditures, but as to the financial requirements it is contingent upon so many outside elements, such as the rates to be received by The Ohio Bell Telephone Company, and also economic conditions generally upon which he is not qualified to speak as an expert, and this is calling for an opinion as to what the financial requirements will be, and I submit that he is not qualified as an expert in that respect.

Mr. Burr: Mr. Kositzky's department is the one which has to spend the money.

Mr. Laylin: We are not objecting to spending the money. Of course it is a question as to financial requirements to which we object.

Mr. Shuler: I venture the assertion that this witness cannot tell the Commission of his own knowledge as a financier or a bond man approximately how much money the Ohio Bell Company can raise on its own resources today, next month or next year, and that is the reason I objected to the first question put. I do not believe Mr. Kositzky can hon-

[fol. 8759] estly testify on that point because he is not a bond salesman, nor is he acquainted with the financing of properties. I do not believe he is. If he is, why, that is different.

Mr. Burr: I am not asking him anything about the amount of money which his company will be obligated to borrow

from the American Company. The question does not ask for that kind of an answer at all. All I asked him was his estimate of the requirements of the Ohio Bell Company for additions for the next five years—the next four years, including 1925, '26, '27 and '28. If the question did include in it the amount which he will require from the American Company, it is none the less competent, because here is a contract which has been in effect for many years, and under it the American Company has been and is now assisting the Ohio Bell Company in its financing of its requirements.

The witness has a long period of experience upon which to base his judgment and there isn't any business in the world, especially that of a utility, wherein the chief engineer of a utility cannot fairly estimate the financial requirements of his company over a period of years in the future.

Mr. Shuler: I have not made any objection to any such question. My sole objection was to the former question, How much money will be required from the A. T. & T. beyond the resources of the Ohio Bell to itself finance? I objected to that question on the ground that Mr. Laylin stated and which I repeated awhile ago. My recollection may be [fol. 8760] faulty, but it is that your last question asked, to which I again objected, was, "What will be required from the A. T. & T. Company by the Ohio Bell Company to finance the next five years program beyond the resources of the Ohio Bell Company to furnish it itself"; and I objected to that question as I did to the others on the ground that Mr. Kositzky cannot, and I doubt whether Mr. Kositzky can tell this Commission right now, how much they have paid from that Company in the last few years.

Mr. Burr: The rates have nothing to do with the question.

Mr. Dotson: Let us have——

Mr. Burr: Just a moment, because I am addressing my remarks to Mr. Shuler.

Mr. Dotson: All right.

Mr. Burr: The rates have nothing to do with the question.

Mr. Shuler: I said nothing about rates.

Mr. Burr: Mr. Laylin did, and you based your objection on the same ground that he did. His objection was that because it is impossible to tell what the rates will be in the future it will be impossible to ascertain the financial requirements of the Company in the way of money to be bor-

rowed from the American Company. The rates have nothing to do with it. The rates are supposed—they never have yet, but they are supposed to produce a fair return upon the property used and useful in the service of the public, [fol. 8761] and that fair return is entitled to go to the people who have had their money invested in this property, to the Company's stockholders, if you please, and it has nothing to do with the amount available for plant capital expenditures.

Mr. Shuler: Your argument in rate cases——

Commissioner Poor: Just a minute. We have had enough argument on this, Gentlemen. We are not determining at this hearing how much money the Bell Company will require in the next two, three or four years. The question is an attempt to justify the payment under the 4½ per cent contract, and one of the services performed by the A. T. & T. Company is financing in whole or in part the needs of the Ohio Bell, without an attempt, so far, by the Ohio Bell to allocate of that 4½ per cent how much is paid for financing. And I do not think it would be very enlightening or very material to the Commission to know how much the financial requirements will be some time in the future.

If it got down to the point where they were allocating and saying that "so much of the 4½ per cent is for financing and so much for furnishing the instruments and things of that kind", it might then be a matter of dollars and cents, but I do not believe it would be very material.

The objection will be sustained.

Mr. Burr: Note an exception, and let the record show that the witness, if permitted to answer the question, would state that the amount estimated to be required by The Ohio Bell Telephone Company beyond its own resources from the [fol. 8762] American Telephone & Telegraph Company for the years 1925, '26, '27 and '28 is not less than $4,000,000.00 per year, or $16,000,000.00 for the four years.

Q. Mr. Kositzky, you have mentioned services which your company has received from the American Company from time to time through correspondence and telephone conversations, special services, difficult in many instances to evaluate in dollars and cents. Has your Company received during the past year from The American Telephone & Telegraph Company, as a part of the services rendered by that Company to your Company under the License Contract, Company Exhibit No. 1——

Mr. Shuler: I object to the question in its form.

Mr. Burr: Will you please wait until the question is finished?

Mr. Shuler: I object to it as far as you have gone.

Q. (Continuing): any services which you can evaluate? The question calls for a yes or no answer.

Mr. Shuler: I object. He is asking this question to draw a conclusion which is based on a contract.

Commissioner Poor: I think the objection is not well taken. Objection overruled.

A. Yes.

Q. What are they?

A. The American Telephone & Telegraph Company furnishes the Ohio Bell Company transmitters, receivers and induction coils.

Q. Now you say they furnish them; did they do that last year?

A. Yes, sir. As explained quite fully in Mr. Rhodes' testimony, I have made a computation of these services for [fol. 8763] the current year and what they are worth to the Ohio Bell Company on the basis of these instruments furnished.

Mr. Burr: The Exhibit may be marked Kositzky Exhibit No. 30.

And thereupon the Paper Writing last above referred to was marked for purposes of identification as Kositzky Exhibit No. 30.

Q. You said, Mr. Kositzky, that the statement is a statement for the current year; did you mean the year 1924?

A. On the basis of the stations in service at the end of 1923, so it would apply as a minimum to the year 1924, since we are adding stations continuously.

Mr. Burr: The exhibit is offered in evidence.

And thereupon the Paper Writing above referred to was offered and admitted in evidence on behalf of The Ohio Bell Telephone Company and is herewith submitted and marked Kositzky Exhibit No. 30 and made a part hereof.

Q. Will you please explain it?

A. This is the valuation of the instrument service, more or less explained by Mr. Rhodes in his testimony and applied specifically to Ohio Bell. Taking the first cost of in-

struments, the receiver, transmitter and induction coil, as $4.50——

Q. How did you arrive at that amount?

[fol. 8764] A. That is a figure somewhat less than the market price of $4.90.

Q. For the same type of instrument?

A. Yes for the same type of instrument, and applying to that the percentage of annual costs, fixed charges as sometimes called, of 21 per cent. Those fixed charges are made up of interest, taxes, administration, depreciation and maintenance.

To every telephone station in service there are more instruments in the use of the Company than stations, as, for instance, we have instruments on switchboards, private branch exchanges, sometimes two receivers on one set, and we have five per cent more instruments than we have telephones. So computing the annual charges on the basis of instruments in service by adding these additional instruments a multiplication of $4.50 times 21 times 1.05, which gives a figure of 99.2 cents. But in addition to the instruments in service there is kept in supply a 6.6 per cent reserve. That is to assure continuity of the supply. And making allowance for this additional six per cent with an annual cost or fixed charge of 11 per cent—in this case the stock instruments do not require maintenance or that other item of depreciation—adds three cents more per station, or a total cost per station of $1,022.

Q. Cost per what?

A. Annual cost per station for the instruments.

Q. Yes.

A. There are in Ohio 495,397 stations as of December 31st, 1923.

Mr. Shuler: May I for information ask a question as to stations? A station means an instrument?

[fol. 8765] The Witness: That means a subscriber's set, your telephone stand or a wall set, if it is such.

Mr. Shuler: The reason I am asking that is to find out how you got 1.05 for the number of sets of instruments per station. Supposing I have a telephone in my residence and an extension upstairs, would that be called one station or two stations?

The Witness: Two stations.

Mr. Shuler: Then every set does not constitute a station?

The Witness: Yes, but we have more instruments. You may have two receivers on one set. That is very frequently done. People that are hard of hearing ask for a second receiver.

Mr. Shuler: That is the reason you get 1.05?

The Witness: That is only a small part. The larger part is we use instruments, transmitters and receivers on all of our switchboards and they are not included.

Mr. Shuler: I see it.

The Witness: They are not furnished by the A. T. & T.

Mr. Shuler: But if I had two telephone desk stands, induction coil, transmitter and receiver, at two places, in my house, then I would have two stations?

The Witness: Yes, sir.

Mr. Gentsch: I did not understand what you said about the extra set on the branch exchange.

The Witness: The transmitter and the receiver on the [fol. 8766] private branch exchange—that is practically the same as a switchboard. Those are included in the five per cent.

Mr. Gentsch: Why are they included in the five per cent?

The Witness: We don't call that switchboard a station. The switchboards are in addition to the stations. The stations are merely the sets that you have on your desk.

Mr. Gentsch: But you get paid for them?

The Witness: Yes, that is why it is included.

Mr. Burr: I think you are talking about different things.

The Witness: Let us see if I can explain that. I have merely converted into terms of telephone stations all instruments in use. In other words, we have, say, 100 telephone stations, subscribers, as explained to Mr. Schuler, and we have then five private branch exchanges. Those five would add five instruments and we would have 105 instruments for every 100 stations.

Mr. Gentsch: I do not get it yet.

Mr. Burr: See if you can say it some other way.

Commissioner Maullar: You mean the additional instruments add five per cent to the stations?

The Witness: Yes, sir.

Mr. Gentsch: What I am trying to get at is where those instruments are and why they are additional?

Mr. Shuler: Mr. Johnston suggests perhaps removals would provide a little additional too.

[fol. 8767] The Witness: Those are in the supplies, but let us see if I can explain it this way. We have 100 telephones connected to a switchboard. That is all we have. The switchboard has five sets that the operators use in giving the service.

Mr. Gentsch: You mean your own office?

The Witness: Yes, sir, in that particular case, but that also might be in one of the big stores, which may have a switchboard with five sets on it.

Mr. Gentsch: Don't you call that switchboard in a private store a station?

The Witness No.

Mr. Gentsch: It is only the extensions?

The Witness: Yes, sir.

Mr. Dotson: Mr. Kositzky, your Item 10, Number of Stations December 31st, 1923, do the amounts given there include the stations served by the Ohio State instruments that were taken over with the Ohio State property?

The Witness: Yes, sir, those are all of the stations listed in Ohio as of that date.

Mr. Dotson: So that they are included, the Ohio State instruments are included then in the computation you have made in this exhibit?

The Witness: In just what way? There are 495,000 telephones in the State.

Mr. Dotson: What I mean is, you are allowing the A. T. & T. Company the same revenue from the use of those instruments as from the Western Electric instruments?

[fol. 8768] The Witness: Those instruments are going out awfully fast and the A. T. & T. are ready to replace every one as rapidly as taken out.

Mr. Dotson: While they are in use it doesn't interrupt or change the payment of 4½ per cent of the gross revenue from the use of those instruments to the A. T. & T. Company?

The Witness: No, I don't think so. Not at all. This is the instrument service as furnished by the A. T. & T. Company on a basis of——

Mr. Dotson: The number of instruments in use by the Bell Company?

The Witness: Yes, sir, the value of the service the A. T. & T. are ready to furnish us.

Mr. Dotson: Regardless of whether they are Ohio State

instruments or whether they are Central Union instruments?

The Witness: That is right.

Q. Now when the Ohio Bell Telephone Company and The Ohio State Telephone Company were consolidated under the present Ohio Bell Telephone Company, The American Telephone & Telegraph Company stood ready to replace all Ohio State instruments with Bell instruments?

A. Yes, sir.

Q. It has been doing that steadily at your request?

A. Yes, sir. It is not economical to go out and replace them arbitrarily, but as soon as a telephone set is returned to the storekeeper, as explained by Mr. Schneider, the new [fol. 8769] set that is sent out is invariably one of the A. T. & T.

Q. In other words, you have been trying to get as much use as you can out of the old Ohio State instruments?

A. That is right.

Q. How fast are they going out of service?

A. Very rapidly. We had something like 30,000 telephones in Cleveland two years ago, 1921. There are less than four or five thousand there today. So they are going out rapidly.

Q. When you say telephones you mean independent type telephones?

A. Yes.

Q. Which have been replaced by Bell instruments?

A. Those are subscribers' stations.

Commissioner Maullar: Mr. Kositzky, what do you do with the instruments you take in?

The Witness: They are being carted away by the junk dealer by the wagonload.

Mr. Gentsch: Do you know how many Ohio State or Independent sets are in use at this time?

The Witness: No.

Mr. Gentsch: How many were taken over in the consolidation?

The Witness: There were over 100,000 subscribers and I imagine there were at least that many.

Mr. Gentsch: Were those 100,000 sets figured in the valuation here?

The Witness: I am reasonably certain that the inventory men, as they inventory the property, inventory what is there.

[fol. 8770] Mr. Gentsch: Inventory what is there at a uniform price?

The Witness: Yes, and as they correct their inventories any instruments removed would be deducted, and if the State was replaced, less the transmitter, receiver and induction coil, it would automatically correct itself.

Mr. Gentsch: Do you know what those Ohio State instruments were inventoried at?

The Witness: At the prices——

Mr. Gentsch: I am asking you whether you know; not a guess, but whether you know what they were inventoried at?

The Witness: To the absolute cent, no, but I can tell you in principle how they were inventoried.

Mr. Gentsch: I am getting it approximately now. How close to $4.50?

The Witness: Well, the Kellogg instrument was $4.90 and the Stromberg costs $5.35.

Mr. Gentsch: Do you know what was credited to salvage when those instruments were replaced?

The Witness: No, I do not.

Mr. Gentsch: Can you find out?

The Witness: I presume that can be obtained, yes.

Mr. Gentsch: Will you let us know.

Mr. Burr: It would be a long job. Of course they have been coming out gradually.

Mr. Gentsch: I am talking about a single instrument, per instrument. If nobody else has any question on that same [fol. 8771] subject, I would like to ask him to explain one other thing here.

Mr. Dotson: Just one other question on this subject. In speaking of instruments, what do you include?

The Witness: When I mention instruments I mean the transmitter, receiver and induction coil. The stand and the bell box we usually call a set, the substation equipment. I think Mr. Schneider referred to the entire installation as instruments, which perhaps technically is not right, although in general telephone terms that is what we call an instrument.

Mr. Dotson: What effect does the retirement of these Ohio State instruments have upon the capital account of the Company?

The Witness: Whenever one is taken out of plant an amount equal to what is supposed to be on the books is

written off of the books. In other words, the books are reduced as fast as these come out.

Mr. Dotson: To what extent is that reflected in the valuation that is claimed for the property in various exchanges or as a rate base?

The Witness: They are deducted through the addition of net additions, and in some instances it is a red figure.

Mr. Dotson: Do you know what deduction is made from the property value of the Toledo Exchange?

The Witness: I do not.

Mr. Dotson: There should be a reduction there, should there not?

[fol. 8772] The Witness: Well, as fast as they are removed they should be deducted.

Mr. Dotson: Do you remember how many Ohio State instruments were in use in Toledo that were taken over by the Bell Telephone Company?

The Witness: I think we had something like 24,000 subscribers' stations and I imagine there were at least that many instruments, plus five per cent.

Q. You were down to Line No. 10. Will you proceed with the evaluation of the services?

Mr. Dotson: Just one moment. Pardon me. I knew there was something more. Are any of these Ohio State instruments reconditioned from time to time and continued in service?

The Witness: Yes; one thing we do right along, Mr. Dotson, is this; we find that these transmitters are interchangeable, and with very little work in the shop we can fit a Western Electric or Bell transmitter on an extension of a foreign make, Kellogg and Stromberg. The receiver is nothing more than an instrument on the end of a cord and that can be attached to anything. We are doing that right along so as to conserve a number of the subscribers' sets that are really fit for use.

Mr. Dotson: Then as a matter of fact you are really not retiring the Ohio State instruments unless they are so impaired that it would not be wise to recondition them?

The Witness: You are speaking now of the instruments [fol. 8773] ments or the subscribers' stand? The stand is reused whenever possible but the instrument, the transmitter, receiver and induction coil, is very seldom reused.

Mr. Dotson: They are seldom reused?

The Witness: Some of them are practically as good as new, and rather than to take the instrument off where it is of the type that will give satisfactory transmission in that particular locality, it is cheaper to leave it on. It saves expense to the Ohio Bell and some to the A. T. & T. Company.

Mr. Dotson: That is being done then with the Ohio State equipment?

The Witness: To a limited extent, yes, sir.

Q. You were down to Line No. 10. Will you proceed to evaluate the services?

A. Item No. ii is merely the reproduction cost of the instruments in Ohio on the basis of 495,397 stations, including the stock supply, or $2,363,044.00.

Q. You have a revised figure for that, Mr. Kositzky.,

A. Oh, I see. I applied that against the stations when it should be applied against Line No. 9—519,000.

Q. What is the answer then?

A. That would be $2,478,697.00.

Mr. Gentsch: I got mixed in this talk with Mr. Shuler. May In interrupt just to get another explanation?

Mr. Burr: Yes, sir.

Mr. Gentsch: I did not get the explanation of that Item 2. How did you figure the 21 per cent?

[fol. 8774] Mr. Burr: I was coming to that, but you might as well have it now. Go ahead.

The Witness: That is what we call annual charge, or fixed charge; for instance, on every dollar invested in subscribers' sets or instruments there are such charges as interest, maintenance, taxes, depreciation, and those items amount to 21 per cent.

Mr. Gentsch: Give us the detail of that.

The Witness: I beg your pardon. The interest is eight per cent, taxes, two per cent, administration, one, depreciation, eight, and maintenance, two.

Mr. Gentsch: You mean it is costing eight per cent to have the A. T. & T. do the financing?

The Witness: That is what it costs them. That is what it is worth to them to supply this property, or what it would cost us if we had to do it, to do it that way.

Mr. Gentsch: May I ask you right there, in No. 11, what is that factor 1.06?

The Witness: That is for the six per cent additional stock that we carry in supplies to assure the continuity of the supply.

Mr. Gentsch: Isn't that figured in your average of instruments up there?

The Witness: No, sir, that is five per cent. That is the additional sets in use. Six per cent is the additional sets in stock.

Mr. Gentsch: I see.

Q. That is to say, you have in use five per cent more of [fol. 8775] instruments than you have stations?

A. Yes, sir, that is right.

Q. That is due to the factor that you explained to Mr. Gentsch awhile ago; in addition to that five per cent you carry in stock an additional number of instruments equivalent to six per cent in order, as you say, to provide a continuous supply?

A. That is right.

Mr. Gentsch: Now let me ask one more question before it gets out of my mind, and then I will not interrupt any more. If the instrument cost $3.30 instead of $4.50 the calculation would be affected to the extent of that difference, wouldn't it?

The Witness: If it did, yes, sir.

Mr. Gentsch: Isn't it a fact that the A. T. & T. price is $3.30 instead of $4.50?

The Witness: I don't know. I have heard Mr. Rhodes say that the A. T. & T. Company were able to buy from the Western at that price but that does not say that the Ohio Bell could.

Q. What do other companies pay for these instruments in the market?

A. The discounted price is $4.90 upwards, and the Western Electric sell to the trade an instrument very similar to this at $5.80.

Mr. Harshman: Your Exhibit No. 30 shows services rendered to The Ohio Bell Telephone Company by the General Staff of The American Telephone & Telegraph Company; then of course the price which the American Company pays should be the basic price, and not what they might charge [fol. 8776] some other company?

The Witness: In other words, if the Ohio Bell Company had to do this work and furnish this instrument itself this is what it would be worth to us.

Mr. Harshman: Well, I know, but——

Mr. Burr: The witness starts to answer and when it gets

to the point where it is not what somebody else would like to have it, about four men interrupt him at once.

Mr. Harshman: This is not a question of what somebody else might have to do. It is a question of justice, what is right, what the services are that the American Company is rendering to the Ohio Bell Company. If you are going to calculate that you have got to calculate it on the basis of what that instrument costs the American Company, and not what it would cost the Ohio Bell Company or any other company.

Mr. Burr: That is not correct. But apart from that, what I am talking about is the justice of permitting the witness to finish his answer. You ask him a question and then before he has had time to finish his answer he is interrupted by three or four gentlemen on your side, and the stenographer cannot get what the witness says, and that was what was being done at the time when I interjected my objection. Please understand we will give you whatever information you want, but when the witness starts to answer he is entitled to finish it.

Mr. Harshman: His answer was not responsive and I submit the record will proce it.

[fol. 8777] Mr. Burr: If that be so, and I do not admit it is so, certainly it is not the way, to prevent the witness from completing his answer; assuming you do not like the answer, the proper way to do it is by objection to the Commission.

Mr. Harshman: Of course for a long while we have been going along here without observing the proprieties. There has been an awful lot of that.

Mr. Burr: The testimony on this exhibit will look like hash in this record.

Mr. Harshman: It ought to. It mostly is hash.

Commissioner Poor: The Commission understands that this exhibit is introduced for the purpose of showing what the company, The Ohio Bell Company, has saved by reason of the A. T. & T. furnishing this thing, and not as representing what it costs the A. T. & T. to furnish it.

Mr. Harshman: It is an exhibit for the purpose of justifying a charge by the A. T. & T.

Commissioner Poor: Yes, but their method of attempting to show that is by showing what they saved; whether that is a right way of determining what that value is is different;

and they have a right to put it in in this manner. Whether that is sound is for the Commission to determine.

Mr. Harshman: Well, all right, if it is for the Commission to determine as to its soundness.

Mr. Dotson: It would be well, it seems to me, to have in the record the fact as to whether this is based upon the [fol. 8778] cost to the Bell Company; that is, upon an assumed cost. While they don't sell it they probably price it out.

Commissioner Poor: The witness has said it is based upon what it would cost the Bell Company if they had to go out and buy this instrument.

Commissioner Maullar: In the open market.

Mr. Harshman: I submit that that is a false premise.

Commissioner Poor: That might be, but it is a matter for argument.

Mr. Dotson: Do you know what these instruments cost the American Company?

The Witness: No, I do not, except what Mr. Rhodes testified to when he was here in Columbus a few weeks ago.

Mr. Dotson: How much was that?

The Witness: I think something like three thirty or forth cents.

Mr. Dotson: The record will show, although I have forgotten myself.

The Witness: I think that is right.

Line No. 12 is the instrument service, by the application of Line 8—that is the total annual cost per station, to the number of stations in Line 10, $506,296.00, that is what it would cost the Ohio Bell Company if they had to supply these instruments themselves.

Q. Now you have shown us the cost of the instrument service, which, if your Company were to provide it, would increase the Company's annual cost by something like [fol. 8779] $500,000.00. By taking advantage of improvements brought out by the American Company, and of which your Company has had the benefit, have you made any computation as to the savings, both in first costs and annual charges, resulting from them?

A. Yes, sir, I have.

Q. By "resulting from them" I mean resulting to your Company from them?

A. That is right.

Q. Have you a summary of a few of the items which show the savings in the improvements made from time to time as applied to the exchange properties of your company and as against the practices followed at the time those improvements were made?

A. Yes, sir, I have a list here of 11 items, which is only a partial list, showing the savings of first cost and annual charges in which the improvements we have availed ourselves of from time to time resulted to this Company as against the situation where we had not those improvements.

Mr. Burr: That list may be marked Kositzky Exhibit No. 31, and is offered in evidence.

Mr. Shuler: May we have the data?

Mr. Burr: Yes, I was going to ask the witness to give you the basis of the amounts shown in the exhibit.

And thereupon the list above referred to was marked for purposes of identification and was offered and admitted in evidence on behalf of The Ohio Bell Telephone Company and is herewith submitted, marked Kositzky Exhibit No. 31 and made a part hereof.

[fol. 8780] Q. You may proceed to do so, Mr. Kositzky.

A. Item No. 1 is fine wire cables, excepting the 900 22-guage size and the 24-guage size. In other words, up to a certain period we had only available to us cables composed of 19-guage wire. The A. T. & T. Company developed the 22-guage cable, which is a smaller wire, and increased the capacity of the cables.

The difference in cost between the 19 and 22-guages and where we have a 22-guage cable of over 300 pair size, which at that time was the maximum size, of course it would require two cables and the conduits would require additional ducts—the saving in the difference in those cables, together with the additional cost necessary because of the larger duct capacity, amounted, taking the cables that were in service at the end of 1923, a first saving of $9,414,788.00, and computing against that item, which is a difference of first cost, a percentage of annual charges of 15.68 per cent for underground cables, 20 per cent against aerial cable and 14.1 per cent against the conduit, results in an annual saving of $1,554,148.00.

Then the A. T. & T. came along and developed a 900 paid cable, 22 guage, and also a 24 guage cable. This again increased, you might say, the capacity so far as wires were concerned, of the cable plant, and also reduced the cost per cable or per pair, for that matter, and where formerly 600 pair 22 was our maximum size, we now were able to have 900 pair 22 guage; and similarly we were able to have 1200 pairs on 24 guage conductors or 24 cable.

[fol. 8781] That again resulted not only in a saving in cable but conduit. We computed, taking the property as of the end of 1923, a first cost of $1,323,699.00, or an annual cost, applying the same percentages to the various items of plant, of $198,202.00.

Now about 1913, '12 or '13, as Mr. Rhodes explained, they developed the lead-antimony alloy sheath. Prior to that time for every 100 pounds of metal which enclosed the cable core, there was three per cent tin and 97 per cent lead. The use of antimony required only one per cent antimony and 99 per cent lead, or a saving to every 100 pounds of two pounds of tin, substituting two pounds of lead.

The price of antimony is 8¼ cents per pound, lead 10½, tin 53 cents a pound. Where we formerly had three pounds of tin at $1.59 we now used one pound of antimony at 8¼ cents, and two pounds of lead at 10½ cents, 21 cents, or a total of 29¼ cents for the three pounds, as against $1.59, or a saving of about $1.29¾.

In the exchange plant alone we have over 20,000,000 pounds of alloy of the antimony type, and that, applied against the $1.29¾, gives us a first cost figure of $271,100.00, as shown in Line 3.

Applying that to the annual charge saving it is $38,368.00.

Q. You spoke in that answer of cable core; didn't you mean cable sheath?

A. No, the cable sheath encloses the cable core.

Q. I see.

A. The A. T. & T. developed a copper-steel twisted pair [fol. 8782] wire. Formerly we used a pure copper No. 14. The copper-steel is a steel core copper clad and that is surrounded by an insulating compound. The difference between the 14 copper and the 17 copper clad is about $1.13 per foot in place for the material. There are 106 million plus feet of that type of wire in the plant. That gives a first cost saving of $1,208,670.00, and applying to that the annual

saving of fixed charges gives us a saving of $374,688.00.

Q. What is the percentage, the fixed annual charge? It is merely a matter of arithmetic.

A. It is 31 per cent in that case, the depreciation being 15 per cent on that type of wire.

Item 5 is duplex cable. I think I better refer to that under toll savings as the item there is very much for that purpose.

No. 6 is the loading of inter-office trunks. That is, with the introduction of loading coils it was possible to apply them to a smaller gauge wire and get a transmission equivalent of a very much larger wire. The introduction of those loading coils in cities where it is necessary to load inter-office trunks resulted in a saving, as against the use of the larger wire, which means more cables and more conduits, of $3,685,722.00; and the annual charge rate applied to that at 15.16 per cent for the cable and 14 and a fraction for the conduit gives the annual saving of $517,843.00.

Mr. Anthony explained items 7 and 8. I merely included [fol. 8783] the totals here to arrive at the grand total of exchange savings.

No. 9 is the improved local switchboard cords. Prior to a certain date we had the steel cord. I have one here. The switchboard cord is what the operator uses at the switchboard in order to complete the telephone connection. This end is fastened underneath the switchboard and when not in use all that is visible for the operator is this much of the cord. There are weights mounted on a pulley which always tend to keep this cord out of sight. When she uses it she raises the plug, being this end, and makes the connection. Formerly these three conductors in these wires were steel and it required heavier weights to keep them down; and also the steel was a poorer conductor of electricity and impaired the transmission and the steel would get hot and they had a number of cord fires.

So the A. T. & T. developed this tinsel cord.

By the way, this is the appearance of the cord ordinarily. I have removed the outer covering just to show the wires in here, how they are made up; and then at this end I stripped the insulation and separated it so that the detailed make of the cord will be visible. These are some very fine strands of a copper alloy—I think it is bronze; I am not certain—each one of the conductors consisting of 15 of these. They are not round, they are like ribbon, which is wrapped by

silk thread. These altogether make one conductor. There are three sets of conductors in this cord.

Now the cord itself costs more than the old-fashioned [fol. 8784] steel cord, but this cord will last two years where the former cord only lasted four months. Furthermore, the old cord required repair about every month, while this cord requires repairs only about once in eight months.

So that the saving in the cord in, say, a two year period, or the life of this new cord, is about $1.99, and there are over 125,000 cords in the plant. When the cord is replaced it is charged directly to maintenance. It is not capitalized at any time. When replaced it is handled through the maintenance account. And the savings cost per year, through the introduction of this cord is $249,906.00.

The A. T. & T. Company also developed a new type relay. Instead of the old bulky gravity relay used prior to that time, this new relay is a spring relay. The manufacturing cost is less, the maintenance is less, it takes up less space and it is of course much cheaper. The saving in difference in first cost, taking the relays in service in Ohio, at the end of 1923, was $125,028.00, and the annual charges $27,882.00.

Up to about 1915 we used for contact metal platinum, but the price of platinum became prohibitive about this time and they developed a new contact metal. I am not exactly certain of its composition. I think it is mostly palladium. This is much cheaper and answers the purpose as well as platinum; a saving, taking the Company as a whole, of $370,080.00 by this cheaper metal as against what platinum would cost, or an annual charge of $68,465.00.

This makes a total of savings due to the improvements [fol. 8785] in first cost of $16,654,208.00 and annual charges of $3,440,802.00.

Mr. Dotson: That is computed on a five year basis?

The Witness: This is taking the condition at the end of 1923 and whatever improvements are in effect, in order to get the equivalent of what we have today. This is what the additional investment and the carrying charges on that investment would amount to.

Q. Now these savings to which you have referred in Exhibit No. 31, apply, if I understand, to exchange?

A. That is right.

Q. Have you made a similar computation in savings re-

sulting from the improvements evolved by the General Staff and effecting the toll property of the Company?

A. Yes, I have.

Mr. Burr: The list of savings may be marked Kositzky Exhibit No. 32 and is offered in evidence.

And thereupon the list above referred to was marked for purposes of identification and was offered and admitted in evidence on behalf of The Ohio Bell Telephone Company and is herewith submitted, marked Kositzky Exhibit No. 32, and made part hereof.

Q. Explain it if you please?

A. Item No. 1 is the saving due to the employment of lead-antimony cable sheath, as explained in the former exhibit, and in this case applies to the toll cables.

The saving in first cost is $17,945.00, and annual charges of $2473.00.

[fol. 8786] Likewise, of Item No. 2, saving due to copper-steel twisted pair wire as applied against the toll plant, which is a small item, $923,00 in first cost, and $286.00 in annual charges.

The item of duplex cable is quite an interesting one. As we explained yesterday, and also as shown by Mr. Rhodes, the introduction of the duplex cable saved, you might say, 50 per cent of the conductors formerly required in a cable. So taking the number of duplex cables the amount of cables of this kind in the State of Ohio, and assuming that the Ohio Bell had not had the advantage of the duplex cable improvements, and yet provided itself with the same equivalent in physical conductors or additional cable and conduit where such would have been necessary in order to get the same equivalent in circuits, would amount in first cost to $709,-563.00 and an annual cost of $105,183.00.

Item No. 4, the loading of open wires and toll cables, the loading coils applied to the transmission of the cable plant, both open wire and cable, of course increased the transmission of the toll plant. If these loading coils were not available to the Ohio Bell Company and to obtain the same equivalent in transmission they were to use the larger wire in both cables and wire, and where, as I explained yesterday, if a loading had not been applied to the Akron-Cleveland cable, open wire leads would have been necessary, that [fol. 8787] additional investment, to give us that equivalent,

would amount to $820,171.00, or annual charges of $137,311.00.

No. 5, open wire phantom circuits. In order to provide physical circuits in place of the phantom circuits now in use in Ohio, in case the phantom development had not been available, would require additional wire, cross-arms and pole line investments.

This first cost amounts to $7,601,744.00 or, in annual charges, $1,453,485.00.

Mr. Shuler: Is that for the phantom circuits now in existence in the plant?

The Witness: That is right.

Mr. Shuler: And all the phantom circuits in the plant are of this type?

The Witness: Yes, sir. Introduction of repeaters have still further increased the transmission possibilities of the open wire plant in Ohio. We have a number of such repeaters in Ohio, as I explained yesterday, and to get the equivalent transmission without the use of the repeater would have required additional copper, both construction and so on, which evaluated would amount to $736,110.00 in first cost, and $104,828.00 in annual charges.

Items 7 and 8 were explained in some detail by Mr. Anthony and are merely carried as totals in this summary.

No. 9, Improved toll switchboard cords, is the application of the same savings as explained in the previous exhibits [fol. 8788] applied to the toll plant.

No. 10 is the improved line of cut-off relays as used in the toll plant and as explained in the former exhibit.

The item for the switchboard cord, by the way, is $15,842.00, and for the improved line of cut-off relays $7981.00, or annual charges of $1780.00.

The cheaper contact metal employed in the toll equipment would amount, in first cost to $23,622.00 and annual costs $4.370.00 or a total saving, in first cost, of $10,803,795.00 and in annual costs of $2,454,222.00.

Q. What are the total savings of exchange, toll and instrument service in the State of Ohio?

A. The total exchange savings, in first cost, $19,132,785.00; annual charges, $3,947,098.00; toll, $10,803,795.00, first cost; and annual costs, $2,454,222.00; or a grand total of $29,936,580.00 in first cost, and $6,401,320.00 in annual costs.

Q. Isn't there an error in one of those computations?

A. Yes, there is an addition that was discovered—that was added in pencil; I did not notice that those exhibits showed that difference. It merely adds to the figures $18,650.00 in the item of annual charges, or giving a revised total of $6,420,180.00.

Q. There is a mix-up in addition?

[fol. 8789] A. I misread my figure here.

Q. Have you an exhibit covering your last answer? Isn't it covered by the paper which has been marked for identification Kositzky Exhibit No. 33?

A. Yes, sir.

Mr. Burr: We offer Kositzky Exhibit No. 33 in evidence.

And thereupon the paper writing above referred to was marked for purposes of identification and was offered and admitted in evidence on behalf of The Ohio Bell Telephone Company and is herewith submitted, marked Kositzky's Exhibit No. 33 and made part hereof.

Q. Now the exhibit shows certain corrected figures in lead pencil. Will you read those into the record in order that the record may show that the corrections were made at the time the exhibit was offered?

A. Under exchange, the first item, including instrument service, $19,132,805.00, as a saving in first cost; and $3,947,098.00, saving in annual charges.

Under toll, $10,803,795.00, saving in first cost, and $2,454,222.00, savings in annual charges; or a total, not including anything for legal, financial, accounting, use of patent service, of $29,936,600.00, savings in first cost, and $6,401,320.00, savings in annual charges.

Q. The last figure is $6,401,320.00?

A. That is right.

[fol. 8790] Q. Now the payment to the American Company under that contract last year was what, approximately?

A. I haven't ever figured out; I think it was about a million dollars.

Q. So that even if you divided the six million approximately of savings by six and allow nothing for the lega-, financial or accounting services, or use of patents, and the other improvements not evaluated, it equals about the amount of the payment?

A. Just about.

Mr. Dotson: That is argumentative.

Mr. Burr: Oh, it is arithmetic.

Q. Can you give us an idea of the savings, totalling some $6,400,000.00, as they are appliable to the principal exchanges in Ohio?

A. I would first eliminate the toll, take the exchange service savings only, I have made some computations here.

For Toledo, the savings in first cost, $1,368,924.00.

Mr. Dotson: That is first cost?

The Witness: Annual costs, or annual charges, $293,769.00.

For Columbus, savings in first cost, $1,967,580.00 and annual costs or annual charges, $422,317.00. For Akron, $739,167.00, savings in first cost, and $158,417.00, savings in annual costs. For Dayton, $940,460.00, savings in first cost, and $201,834.00, savings in annual charges. In Canton, $427,528.00, savings in first cost, and $91,745.00 savings in [fol. 8791] annual charges. For Cleveland, $9,650,793.00 savings in first cost, and $1,937,068.00 savings in annual charges.

This does not include the legal, financial, accounting or other services not mentioned.

Mr. Burr: You may cross-examine.

Mr. Gentsch: Does this conclude Mr. Burr's testimony?

Mr. Shuler: Does this conclude your case, Mr. Burr?

Mr. Burr: With the exception that when we meet for the cross-examination we would like to have the privilege of calling one witness for a short examination, the witness not being available at this time. I have already mentioned it to some of the gentlemen here and the Commission. We are unable to produce the witness at this hearing, although we have tried. We ask the privilege of calling him at the next hearing just before the cross-examination starts.

Mr. Shuler: Then does this mean that the toll case or the 4½ per cent case, so far as you are concerned, is closed?

The Witness: So far as we now know, we are finished.

Mr. Gentsch: Have you any objection to saying who the witness is and what his testimony will show?

Mr. Burr: It will be on the question of the value of the financial services.

Commissioner Maullar: I would like to ask just one question. Do you know whether or not the independent

[fol. 8792] telephone companies of the State of Ohio are enjoying the benefit of many of these improvements in the equipment that you have mentioned in this Exhibit 31 and Exhibit 32?

The Witness: Yes, sir, they are.

Mr. Hagelbarger: Mr. Kositzky, I have been requested to ask you if you have made any computations for the City of Massillon, the same as you have for the other cities?

The Witness: Yes. I did not read those figures.

Mr. Hagelbarger: Will you do so?

The Witness: The saving in first cost, $156,284.00 in annual costs or annual charges, $31,238.00.

Mr. Dotson: Mr. Kositzky, the equipment you have enumerated in your Exhibits 31 and 32 have been purchased by the Ohio Bell Company from the A. T. & T. Company at regular market prices for such equipment?

Mr. Burr: That is not correct.

Mr. Dotson: The witness is to answer.

The Witness: No, sir.

Mr. Dotson: Oh, they have been purchased from the Western Electric Company, all of them?

The Witness: Many of them. Most of them.

Mr. Dotson: What part have not been purchased and are not owned by the Bell Telephone Company, The Ohio Bell Telephone Company? I am referring to the equipment you have specified in Exhibits 31 and 32?

Mr. Burr: You understand what he means by the question.

[fol. 8793] The Witness: I don't know exactly that I do; I do know this, that we are buying materials from other sources from the Western Electric, but it is under the A. T. & T. Company's specifications.

Mr. Dotson: What I mean is, you are buying the equipment manufactured by the Western Electric Company and the Western Electric Company is employing the improvements mentioned by you in these two exhibits 31 and 32 in the manufacture of that equipment?

The Witness: That is right.

Mr. Dotson: Now you purchased that equipment, or have purchased that equipment from the Western Electric Company at the regular market price?

The Witness: That is right.

Mr. Burr: That is the regular market price to associated Bell Companies?

The Witness: Yes, sir.

Mr. Shuler: I object to Mr. Burr putting language in the witness' mouth.

Mr. Dotson: Is that market price any different from the market price paid by your connecting companies, if you know?

The Witness: I don't know right at this minute, but I have made investigations in the past and the market price was different.

Mr. Dotson: In what respect?

The Witness: We buy our materials for less money than [fol. 8794] the independents are able to get similar material.

Mr. Dotson: I mean now the price which the Western Electric gets for this equipment, no matter who the Western Electric sells, does not The Ohio Bell Telephone Company pay the same price that any other purchaser of this equipment pays when it buys it from the Western Electric Company?

The Witness: No, sir. The Independents cannot buy cable, for instance from the Western Electric Company as cheaply as we buy it.

Mr. Dotson: Why is that?

The Witness: Because we have a special arrangement with the A. T. & T. Company and with the Western Electric Company that gives us that advantage.

Mr. Gentsch: You mean it puts the other fellow at a disadvantage.

Mr. Dotson: That is because the Ohio Bell Company is owned by the A. T. & T. Company, who owns the Western Electric Company; isn't that true, as a matter of fact?

The Witness: Well, that is because of our contractual relations.

Mr. Dotson: Well, the 4½ per cent contract does not provide anywhere in it that The Ohio Bell Telephone Company will be permitted to purchase any of the material mentioned here or those manufactured by the Western Electric Company at a less cost than the Independents, does it?

The Witness: No, but we have contracts with the Western Electric Company. Those contracts can only be made by [fol. 8795] the Bell Companies.

Mr. Dotson: That is outside of this 4½ per cent contract?

Mr. Burr: Not at all, if you will read the contract. The contract is the best evidence.

Mr. Dotson: You have talked about the contract so I am taking the same liberty. Now on what basis do you allocate the alleged savings to Toledo; what basis——

The Witness: Well, I take the savings for the State as a whole, as I have computed them in Exhibit No. 31, and then I know what percentage the Toledo property is of the State as a whole, and I have allocated it on that basis.

Mr. Dotson: On what basis do you figure that percentage?

The Witness: On the value of the property in the Toledo area.

Mr. Dotson: The total number of stations?

The Witness: On the property for the exchange savings, and the stations for the instrument savings.

Mr. Dotson: Is that the same basis you applied all over the State to the various exchanges you have mentioned?

The Witness: Just these few larger ones. It would not apply to the very small ones in the same proportion, and for that reason I have not tried to allocate it to the smaller ones.

Mr. Dotson: Something has been said here at various times that in Toledo the Company is not permitted to run [fol. 8796] telephone wires on electric light poles—I want to ask you a question or two about that—and that by reason of this the installation, operating and maintenance costs are proportionately much higher, or increased, rather, above that of what it would be if they were permitted to jointly use the same poles; that is true, isn't it?

The Witness: That is true as far as the poles are concerned, yes.

Mr. Dotson: Now to what extent is the cost of installation, operation and maintenance increased in Toledo by reason of this fact, do you know?

The Witness: I haven't figured it; I couldn't answer that.

Mr. Dotson: Do you know whether anybody has any figures on that?

The Witness: It is pretty difficult. All we can say is, from experience it would be greater.

Mr. Dotson: But if the Company would be permitted now to make joint use in Toledo with the Electric Light Company, this, in your judgment, would effect the savings in the respects I have mentioned?

The Witness: Yes, sir.

Mr. Dotson: To what extent would that savings be re-

flected in the rate that you are asking for in the Toledo Exchange area?

The Witness: I cannot answer that.

Mr. Dotson: Do you think it would be reflected?

The Witness: There would be a lower plant investment. [fol. 8797] It would take some years to remedy the condition that is now there. But, however, if you do not start today it never will be remedied. So that at some future date there no doubt should be a big advantage in that.

Mr. Dotson: In a considerable portion of Toledo, joint use of poles is made; has that fact been taken into consideration in arriving at the proposed rate in Toledo?

The Witness: It is based on the valuation of the property, and the cheaper you can build that property, the less there will be for maintenance, depreciation and return necessarily.

Mr. Dotson: Well, you will be off the witness stand a little later and I will probably want to talk to you.

Commissioner Poor: I believe we have the week of April 21st set aside for cross-examination in this matter.

Mr. Dotson: Before we adjourn I have a number of requests I would like to make of several witnesses. I have them typewritten, so that I will not read them into the record.

One pertains to Mr. Schneider, one to Mr. Anthony and a few questions here to Mr. Kositzky.

Counsel for the City of Toledo presented the following requests:

Schneider Exhibits

Referring to Schneider Ex. No. 1, we would like to know what the composite life is, of the entire plant, based on this exhibit, as well as the composite annual depreciation rates. [fol. 8798] We want a detailed outline of the method of calculation, with supporting data and sufficient detail to check.

We want the detailed calculations of contral office, equipment, station apparatus, station installations, interior block wires, private branch exchanges, booths & special fittings, together with supporting data for all items appearing in this exhibit in sufficient detail that we can check.

We are particularly interested in the details of how the net salvage was arrived at and in this connection we would request that the company furnish us with examples of actual

entries in their books of account, as well as supporting plant records, estimates and orders that are relevant.

In regard to Schneider Exhibit- 2 and 10 inclusive, we want a detailed calculation of one point on each of the curves in these various exhibits, together with all of the supporting data so that we may check these exhibits in detail.

The above data to include the detailed calculations for a point on the curve labeled "Plant in Service at Beginning of Year" and also a point on the curve labeled "Reverse accumulation of Gross Additions".

We are particularly interested in a clear definition of what you mean by extraordinary repairs, together with an analysis of what this includes.

Referring to Schneider Exhibit No. 11, we want to know [fol. 8799] what the composite life would be which corresponds to the column E and D, in other words, what is the composite life based on the 7.03, as well as the composite life based on 7.28, and supporting data.

We would also like to know what the proper realized depreciation would be based on these annual rates.

Anthony Exhibits

On what data are the Anthony Exhibits based?

We would like to have a detailed outline of the design of the local training switchboard for both A & B?

Why should they differ as between cities?

We want to know wherein this equipment would differ, for instance in Toledo from that in Columbus or Youngstown or Dayton.

In what way does the toll fundamental plans or plan effect the traffic conditions?

If a fundamental plan takes care of the force requirements for 15 to 20 years, how often is a fundamental plan made?

What proportion of the total cost of the fundamental plan does the part covered by traffic bear to the total?

What was this cost in Toledo when the last fundamental plan was made?

When was the last fundamental plan made?

How do you check your single ticket method for accuracy; in other words, what is the control?

Referring to the #1 C board, as we understand it, this

[fol. 8800] is the full feature multiple lamp board. What is the average time to complete an A board call?

What is this in traffic units and what is a traffic unit?

What is the answering time on a board equipped with a traffic distributer?

How does it compare with the #1 C or full feature manual?

How many traffic units or what portion of a traffic unit is utilized in completing a call on this type of board?

How does it compare with full automatic and auto-manual operating, covering comparison by traffic units?

Under average conditions including the average number of outgoing trunks, what is the practical unit of manual operation?

Also furnish full details and supporting data of the following:

1. Single ticket toll operating method against two ticket method showing the savings claimed of $570,000.00 in 1923.

2. Prepay coin boxes showing the savings claimed of $139,031.00.

3. Machine ringing showing a savings of $267,377.

4. Overlapped ringing showing a savings of $76,318. and showing in what particular this is an advantage to the subscriber.

Who, if you know, originated what is known as the fast manual, similar to your #1 C, that is having multiple lamp [fol. 8801] signals and feature cords?

Who developed and owns the fundamental patent on automatic coin collectors?

Who owns and developed the fundamental patent on the motor generator ringing equipment?

G. A. Kositzky

Furnish complete supporting data of cost of fundamental plan of Toledo showing the portion of the costs incurred by the A. T. & T. Company and the amount incurred by the Ohio Bell Company.

* * * * * * *

[fol. 8802] Frederick L. Rhodes, recalled as a witness for purposes of cross-examination, testified as follows:

Cross-examined by Mr. Kinnison:

Q. Mr. Rhodes, your connection with the telephone business began in 1893, did it not?

A. 1892.

Q. That was the year in which you received your degree at the Massachusetts Institute of Technology?

A. That is right.

Q. And you have been connected with the telephone business and with the parent company in the telephone business ever since that time?

A. Yes, first with The American Bell Telephone Company and then with The American Telephone & Telegraph Company.

Q. At the time you commenced your service The American Bell Telephone Company was occupying substantially the same relation to the telephone business that The American Telephone & Telegraph Company now occupies?

A. Well, I cannot say as to how completely. It was the company that furnished the services under the license contract at that time.

Q. How is that?

A. It was the company that furnished the license contract services at that time. My connection with the business has been with the furnishing of these services and I was connected with this work at that time.

Q. Has your connection been entirely with the furnishing [fol. 8803] of these services?

A. Yes.

Q. The American Telephone & Telegraph Company was organized in what year?

A. Why, I am not sure, but I think it was about 1885.

Q. 1885?

A. That is my recollection. It is a matter of record. I can ascertain it if you wish.

Q. Now I am asking about The American Telephone & Telegraph Company.

A. Yes.

Q. When it took over the business of The American Bell Telephone Company?

A. It was either in 1900 or 1902 that I was transferred to the American Company. I can tell you that—1900.

Q. 1900. Then the American Telephone & Telegraph Company was organized in 1885; is that correct?

A. It was very early in the business—for the operation of the Long Lines service.

Q. And it existed along side of The American Bell Telephone Company from 1885 until 1900?

A. It had an early existence. I may be able to find that date for you in one of the early annual reports. I am not sure. I don't happen to find it, but it is a matter of record. But I can look it up and let you know.

Q. Will you do so, please.

The Witness: Do you remember, Mr. Burr, what that date was?

Mr. Burr: No.

Q. There was a period, however, of several years when these two companies existed at the same time?

[fol. 8804] A. Oh, yes.

Q. When was The American Bell Telephone Company organized?

A. In 1880.

Q. Now is that the first organization of Bell interests in the telephone business?

A. No, sir.

Q. What was the organization prior to that time?

A. The National Bell Telephone Company.

Q. When was that organized?

A. March 13th, 1879.

Q. Now was that the first company organized to operate the telephone business?

A. I think not.

Q. What before that?

A. There was a Bell Telephone Company, so-called, July 30th, 1878.

Q. Is that the first?

A. That was preceded by a voluntary association called the Bell Telephone Company. That began in August, 1877.

Q. Was that the first?

A. As far as I know, it was, yes, sir.

Q. That is the beginning of the Bell telephone industry, is it?

A. Why, yes, I think as far as an organization goes.

Q. In an organized way?

A. I think so.

Q. Was that a commercial organization? Did it establish lines and furnish service to the public?

A. I don't know.

Q. Did it do anything more than develop the industry in a scientific way and get ready to go into business?

A. I cannot say as to that either.

Q. Can you tell who organized that organization?

[fol. 8805] A. No; that again is a matter of record.

Q. Where is it a matter of record?

A. Why, I think that there was in our Bell Telephone Quarterly, a recent number,—one of our people collected a good deal of information about that early historical period and I think it can be obtained for you.

Q. Do you know what business it did while it was in existence?

A. Beyond—no, beyond the fact that it is my best knowledge that it furnished the instruments and services to the licensees.

Q. You are now talking about The Bell Telephone Company, a voluntary organization, not a corporation, which was organized in 1877?

A. That, and its successors, yes, sir.

Q. Its successors were those which you have named, in inverse order?

A. Yes, sir.

Q. You have named all of them leading up to The American Bell Telephone Company, which was organized what year?

A. March 19, 1880. That is to the best of my knowledge and belief, sir.

Q. Then The American Telephone Company was organized in 1885?

A. Yes, sir.

Q. And the American Bell Telephone Company continued in existence down to what time?

A. I am not sure as to that, but not very many years ago.

Q. But it transferred the business, the telephone business, in which it was engaged in the year 1900, is that correct?

A. By telephone business you mean what we have been [fol. 8806] talking about, the furnishing of these instruments and service? That I testified occurred in 1900. I remember that because my transfer was made from the payroll of The American Bell Telephone Company to The

American Telephone & Telegraph Company at that time and my associates were so transferred.

Q. That was in 1900?

A. Yes, sir.

Q. Now, after 1900, what did The American Bell Telephone Company do, what business did it engage in?

A. As far as I know it retained, or rather the ownership of the instruments was in its name for a good many years.

Q. But all of the business was handled by The American Telephone & Telegraph Company?

A. All that I had anything to do with.

Q. What was the function of The American Bell Telephone Company during this period?

A. I don't know. You know I have not been mixed up in the corporate matters. I have been concerned with this job of furnishing the services, and all of the information I have picked up about it, what I happen to know about those early corporations, was drawn from an article written by some person in our organization going over the early history.

Q. Can you produce that for us?

A. Yes, sir.

Q. Will you do so?

A. I cannot right now.

Q. The American Bell Telephone Company, as I understand you, did nothing excepting furnish service under the license contract to the licensee companies, is that correct?

A. Why, in the very early days it had an ownership in the associated companies, a partial ownership in the asso-
[fol. 8807] ciated companies.

Q. Did it, as a matter of fact, organize associated companies?

A. I cannot say as to that.

Q. Is that a matter of record?

A. I do not know.

Q. What was the first company operating in the State of Ohio as a licensee company, do you know?

A. No, sir, I haven't any idea.

Q. Was there any company engaged in business in the State of Ohio under a license from the Bell Company prior to the Central Union Company?

A. I don't know.

Q. Do you know when the Central Union Telephone Company first began business in the State of Ohio?

A. No, sir.

Q. Was it engaged in conducting a telephone business in the State of Ohio in the year 1892 when you went with the Company, when you went with the American Bell?

A. I could not say. I was pretty fair down the line when I started and I did not know much about such matters.

Q. What was the first information you had, or the first connection you had as an employe of The American Bell Telephone Company with the Central Union operating a telephone business in the State of Ohio?

A. Why, I cannot remember, sir. I suppose that some of the work that I did within a few years after I came with the American Company was for the benefit of whatever company was operating here in the State of Ohio, but what its name was I don't know; I cannot remember.

[fol. 8808] Q. You have not been connected with The American Bell Telephone Company in any way since 1900?

A. That is right.

Q. You knew, however, of its existence down to how late, how long ago?

A. Why, I should suppose somewhere perhaps six or eight years ago.

Q. About that time it was dissolved and went out of business?

A. It was wound up. However that was done I do not know.

Q. What was it doing in the last few years between 1900 and the time when it was wound up?

A. As far as I know the instruments were stamped as the "property of The American Bell Telephone Company." Beyond that I don't know.

Q. That is, not only the instruments that were in existence when The American Telephone & Telegraph Company took over this instrument service, but new instruments that were furnished, continued to be furnished by The American Telephone & Telegraph Company and put out under license to the associated companies by The American Telephone & Telegraph Company, is that correct?

A. I think the instruments were put out by the American Company and they were stamped the "Property of The American Bell Telephone Company."

Q. Were they in fact the property of The American Bell Telephone Company?

A. I am sure I could not tell you about that fact.

Q. Do you know what the relation was between The American Telephone & Telegraph Company and The American [fol. 8809] Bell Company?

A. No, sir.

Q. Was there any contract you know of existing between those companies that covered this instrument service in any way?

A. Not as far as I know.

Q. Did you have any relations yourself in any of your work with any officers or employes of The American Bell Telephone Company during that period?

A. I might have unconsciously, but there was nothing to bring the fact to my mind.

Q. There was nothing then so far as your connection with the business of the A. T. & T. Company was concerned that differentiated the transactions of the A. T. & T. and The American Bell Telephone Company?

A. No. All that I knew was, as I said, that I was part of this organization furnishing these services and I did change from one payroll to the other and I gave you the date. Now that is all I know about it.

Q. Was there any change in the character of your services coincident with the change from one payroll to the other?

A. No, sir.

Q. You continued to perform the same services in the same manner?

A. Yes, sir.

Q. Reported to the same superior officer?

A. Yes, sir.

Q. The two organizations were identical, were they?

A. I would not say that. All I know is my relation to it was the same.

Q. Were the same persons concerned in the two com- [fol. 8810] panies as general officers?

A. I could not say that, sir.

Q. Do you know anything at all about the personnel of the boards of directors of the two companies?

A. No, sir.

Q. Do you know anything at all about the management officers of the two companies?

A. No, sir.

Q. Who was the president? Who was the last president of The American Bell Telephone Company?

A. I don't know. I could tell you back in 1900 who it was. I could look that up.

Q. To whom did you report as your superior officer during your last period of service of the American Bell?

A. Hammond V. Hayes.

Q. What was his position in that organization?

A. He was in charge of what was called the Mechanical Department.

Q. The Mechanical Department?

A. It was the Technical Department at that time; that was in 1892 you are asking?

Q. No, I am asking about 1900, when you changed from one payroll to another?

A. It was the same. I can tell you I reported to him from 1892 to 1907.

Q. Then you reported to him both as your superior officer under the American Bell organization and under the A. T & T. organization?

A. After that change came in 1900, yes.

Q. Up to 1907?

A. That is right.

[fol. 8811] Q. Then until several years ago you knew of the existence of these two companies side by side?

A. I understand that The American Bell Telephone Company was not finally wound up until I think about that period.

Q. Then at this time, seven or eight years ago, the only property that you know of that the American Bell Company retained, that is these instruments, was transferred to the A. T. & T., and since that time those instruments have been the property of the A. T. & T. Company; is that correct?

A. The only thing I know is that up to a certain time, which I think was about that time as near as I recollect, the instruments were stamped "Property of The American Bell Telephone Company," and subsequent to that time "Property of The American Telephone & Telegraph Company."

Q. But you don't know whether that represents the true fact as to the ownership of those instruments or not?

A. I only know just what it said.

Q. During that period when The American Bell Tele-

phone Company was the apparent owner of these instruments the A. T. & T. Company was making the contracts with the licensee companies, was it?

A. I cannot tell you that.

Q. And received the 4½ per cent?

A. I never had anything to do with the contracts at all, as I told you. I have been connected just with the organization that furnished these services.

Q. Now how many of these licensee companies are there at the present time?

A. My recollection is that there are 25. There were 25, not including the Long Lines.

[fol. 8812] Q. Why do you say "not including the Long Lines"?

A. Because if I had included those there would have been 26.

Q. Why should you think of including the Long Lines?

A. They pay the 4½ per cent.

Q. Although they are not a separate company?

A. No, they are a separate organization.

Q. A separate organization in the form of a department of The American Telephone & Telegraph Company or something of that kind?

A. Yes.

Q. Then operating under the name of the Long Lines Department of The American Telephone & Telegraph Company?

A. Yes, that is right.

Q. Does The American Telephone & Telegraph Company make a contract with the Long Lines Department of The American Telephone & Telegraph Company?

A. I do not know that. I know they receive services and pay 4½ per cent.

Q. So far as that is concerned they are in exactly the same relation to The American Telephone & Telegraph Company as is The Ohio Bell Telephone Company?

A. I always regarded them such in our work. I cannot, as far as the legal matters go, you know, testify; I am not competent to testify on that, and I do not want to give the impression that I am talking about that, because I am not.

Q. So far as you are concerned, however, as the head of a Department of the General Staff of The American Telephone & Telegraph Company there is no distinction between the relations of the A. T. & T. Company and its Long Lines

[fol. 8813] Department and The Ohio Bell Telephone Company that you can observe in your day to day work as the head of that Department?

A. First of all, you have promoted me, because I am only the head of a part.

Q. All right, that shows how I am thinking about you?

A. Thank you, sir. In that relation there is of course this difference, that the Long Lines Department does not operate any local exchanges and so only obtains comparatively few instruments for its use, but other than that we regard them practically as though they were a separate company and as though they were an associate company.

Q. This Long Lines Department, where does it operate?

A. All over the United States.

Q. Does it have a single organization covering all of the United States or does it have local organizations in different states that are some how connected as an entire organization?

A. Well, it is my impression that there are local organizations, state companies.

Q. State companies that report to the Long Lines Department of the A. T. & T. Company?

A. I may not have this right, but it was my recollection that those were organized in connection with the acquiring of the right of way.

Q. So as to give a local status for the purpose of acquiring right of way?

A. So far as I have always understood it; I may be wrong about it; I do not know.

Q. But except for that local purpose—that legal purpose, they become a part of the Long Lines Department of the A. T. & T. Company?

A. I could not say as to that. You are again getting into [fol. 8814] legal matters that are outside of my knowledge.

Q. You seemed to know so much about this organization that we wanted to find out if you knew a little bit more.

A. I am willing to tell you all I do know, but I do not want to get beyond the things I do know about.

Q. Now these 25 companies, in addition to the Long Lines Department, are any of them operating, any two of them, any two or more of them, operating in the same territory?

A. No.

Q. Each one has its distinct part of the United States in which to operate?

A. That is my understanding.

Q. And all of them together cover the entire United States?

A. I think so. That is, Continental United States.

Q. Do they cover any territory outside of Continental United States?

A. Not as far as I know.

Q. Does the Company reach over into Canada, for instance?

A. There is another company in Canada.

Q. Is that a Bell Company?

A. It is called The Bell Telephone Company of Canada.

Q. Does it have similar license contract arrangements with The American Telephone & Telegraph Company?

A. Not similar, as I understand.

Q. Does it have any license contract arrangements?

A. It has some arrangement under which it obtains the services and it gets its instruments in Canada. The instruments it uses are manufactured in Canada.

[fol. 8815] Q. By whom?

A. I think by The Northern Electric Company it is called.

Q. Is that company controlled by The American Telephone & Telegraph Company by stock ownership?

A. The Bell Company of Canada?

Q. Yes.

A. No, I think not. It is my understanding that the American Company has a minority ownership there.

Q. All of these 25 companies are owned by The American Telephone & Telegraph Company, are they not?

A. No.

Q. Which of them are not?

A. I don't know that any of them are owned. It has an interest in all of them and there are some in which it has a minority interest.

Q. In which of these companies does it have a minority interest?

A. In the Cincinnati & Suburban Bell Telephone Company and The Southern New England Telephone Company.

Q. And in the other 23 it has a majority interest?

A. It has what I have understood is a majority interest, yes.

Q. Controlling interest?

A. I understand so, yes, sir.

Q. You understand that in The Ohio Bell Telephone Company it owns all of the stock excepting to qualify the directors of that company?

A. I only understand what I have heard since I have been out here. I have no other knowledge.

[fol. 8816] Q. You never heard that before?

(No reply.)

Q. Now with all of these 25 The American Telephone & Telegraph Company has a license contract similar, if not identical, with the contract which it has with The Ohio Bell Telephone Company, does it not?

A. I have not seen them all, but that is my understanding, that it is the same type. There may be minor exceptions, but it is my understanding in general that it is the same thing.

Q. You are familiar with the annual report of The American Telephone & Telegraph Company for 1923?

A. I read it through.

Q. You recall the statement on Page 6 of that report: "The associated telephone companies"—I understand by that term you refer to these 25 companies?

A. That is right.

Q. "In which your company is a stockholder, owning directly or indirectly all of the common stock of 14 companies, a majority in nine companies and a minority in two companies, The Southern New England Telephone Company and The Cincinnati & Suburban Bell Telephone Company"—that is the situation as you understand it, is it not?

A. Yes, if it is in the report it is so.

Q. Whatever is in the annual report is correct?

A. I think so.

Q. Are you familiar with the letter by President Thayer of The American Telephone & Telegraph Company, dated November 2nd, 1923, published in connection with the issue of $100,000,000.00 of debentures, in which he states: "The [fol. 8817] American Telephone & Telegraph Company is more than a holding company in the ordinary sense. It is the central organization of the Bell System"?

A. I don't know that I ever came across that letter before, no.

Q. But that is really the fact with reference to the rela-

tion of The American Telephone & Telegraph Company to these associated companies?

A. That it is the central organization?

Q. Yes.

A. In the sense in which Mr. Thayer used it and in which he has used it, it is so, yes.

Q. You are not familiar, I assume, with the details of the making of any of these contracts with the associated companies?

A. No, sir, that is out of my line.

Q. That is entirely out of your purview?

A. Yes, sir.

Q. Now this original voluntary organization of 1877, as I understood you to say, had no business excepting the licensing of other people to use the patents which it controlled and the facilities which it was able to furnish, is that correct?

A. I did not undertake to say that. I said that it was my understanding that that is at least part of what it did. Beyond that I do not know. The only thing I do know is this, that the furnishing of the instruments and the furnishing of the service to the companies operating around in the field of the present American Company and its predecessors, so far as I know, has been a continuous thing from the beginning of the business.

Q. When did the American Company, either the Ameri-[fol. 8818] can Bell or The American Telephone & Telegraph Company or any of its predecessors, first engage in the business of furnishing any sort of service, any sort of telephone service, as distinguished from making these license contracts?

A. You mean furnishing a commercial telephone service?

Q. A commercial telephone service, yes.

A. Well I don't know whether any of these early companies I mentioned back there in the first three years of the business did furnish themselves commercial telephone service or not. With that exception it was not until The American Telephone & Telegraph Company began operating the Long Lines.

Q. That was in 1885?

A. That is my understanding, it was in 1885, yes, sir.

Q. To engage in the business——

A. And furnishing the instruments and the service, as far as I know, yes.

Q. Did they organize any of these companies with which they made these license contracts?

A. I cannot tell you that, sir. I do not know.

Q. You don't know whether they went out and organized the companies or found people willing to engage in the business and licensed them?

A. It was my understanding that they would undertake to interest people that had money to start companies and take out licenses and start in the telephone business, and they issued licenses to these people when they found them.

Q. When they found them and made these contracts with them originally they would have no interest in the business [fol. 8819] except this license contract?

A. It has always been my understanding that these contracts were made at arms length in the beginning, yes.

Q. When did the central company first begin to acquire interest in these subsidiary companies?

A. Oh, that was away back in the early days.

Q. What do you mean by "the early days"?

A. Away back at the time the licenses were granted.

Q. From the very beginning then they had an interest——

A. They had some interest in many of them. I don't know whether that was in all or not.

Q. But that policy has continued as the policy of the central company down to the present time until we have the situation that is set forth in the 1923 report?

A. It is the fact that the situation is as set forth there, yes.

Q. And as I say that has always been the policy of the company, to acquire immediately and own these interests in that way?

A. It has had these ownerships. I can not discuss the policy because I have not been connected with it. I simply know what has gone on in some cases.

Q. So far as you know that has been the continuous procedure all the time?

A. So far as I know there has been some interest in these companies. That is as far as I can go.

Q. When did you first see any independent movement in the telephone business outside of the Bell organization?

A. Why, it came about, I should say, in general terms, at [fol. 8820] the time that the original Bell patents on the instruments expired.

Q. Which was about what time?

A. It was about 1893 or '4.

Q. 1893 or '4?

A. I should say so, yes.

Q. At that time other people commenced to organize companies independent of the Bell Company?

A. I think that is right.

Q. That was the beginning of the Bell movement—of the independent movement, I should say?

A. I should say so.

Q. And the Bell Company met that competition as best it could, I suppose, and acquired those independent companies as it could?

A. Well, I don't know about that, I know that we continued, the associated companies continued to give telephone service and to try to meet the demands of the public; any acquiring of companies was done, as I understand, by these associated companies around in the field.

Q. What did the Bell Company have to do with acquiring these independent companies?

A. That is beyond me. I wasn't in that end of the game at all.

Q. Now, as I understand, the telephone industry as developed by The American Telephone & Telegraph Company and its predecessors—I wonder if this would be a fair statement? I am reading again from the 1923 report.

A. What page is that on?

Q. Page 7, the second paragraph on that page: "By [fol. 8821] virtue of stock ownership and contracts and relations which grow out of them, the Bell System operates practically as a single organization, offering telephone service to the people of this country without limitation of distance or property ownership. By its leadership in the art of telephony all that science and invention have made possible are available for use throughout the Bell System." Is that the situation in the telephone industry as you understand?

A. Yes, as I understand those words, it is.

Q. Along about page 201 you refer to an article in the 1920 edition of the Encyclopedia Americana?

A. Yes, that is it.

Q. You say, "In cooperation with another member of our committee"——

A. I should not have said "committee".

Q. That is what the transcript shows?

A. That is wrong. That is not committee. It is with another member of our company, our organization.

Q. There was no reference to a committee and I wondered what that meant.

A. It was the man who was then acting as our chief engineer.

Q. Who is that?

A. Mr. Gharardi. His father was a Rear Admiral in the United States Navy.

Q. Now, as I understand your statement in your direct testimony, the General Staff has been in existence from the time, as you interpret the situation, when Dr. Bell and Mr. Watson worked together in the original development of their ideas?

A. Yes, sir.

Q. The Bell idea?

A. Yes, sir.

[fol. 8822] Q. The organization has been continuous in some form down to the present time?

A. That is my understanding, yes.

Q. The present organization is a direct result or development of that original start?

A. Yes, it has been a continued growth. I do not mean by that that it has always every year been bigger than it was the year before, because there have been changes, but there have been technical departments and the technical departments of this central organization have been furnishing these services to the associated companies from the beginning.

Q. And down to 1885 that General Staff and the organization that had to do with the making of these contracts and collecting the license fees was all there was to the central organization; is that correct?

A. I could not say as to that.

Q. It was not conducting any other business, was it?

A. I do not know. I might say something that was not so if I answered that. I do not know. I just do not know.

Q. But it did not go into the business of commercial telephony until 1885?

A. That is my understanding, that that is when the Long Lines Department started to build and operate the Long Lines, connecting the territories of the associated companies; that is, the first line, long line as we term it, was

the line from Boston to New York, and I think that was put into operation in 1884, and it was just about that time that there was this Long Lines organization created for that purpose.

[fol. 8823] Q. And prior to that time the telephone business had been a purely local business conducted by these various licensee companies scattered over the country?

A. So far as I know there had been no means of connecting the territories together.

Q. Now since 1885 there has been a gradual development on Long Lines business which The American Bell Telephone Company has operated down to the time when it was taken over by the A. T. & T. Company; is that correct?

A. No, I do not understand it that way. Those Long Lines have been operated by The American Telephone & Telegraph Company from that period, about 1884 or '5, right down to the present time.

Q. Then The American Telephone & Telegraph Company was first organized to conduct the Long Lines business?

A. Yes, sir, that is my understanding.

Q. As a separate company for that specific purpose?

A. That is my understanding.

Q. And the instrument service was left with The American Bell Telephone Company, and The American Telephone & Telegraph Company originally had nothing to do with that; is that correct?

A. That is my understanding. Before that time and after that time The American Bell Company was providing the instruments and the services because during that time up to 1900 I was on the payroll of The American Bell Telephone Company and I was engaged in the work of furnishing these services.

Q. Then up to 1900 the A. T. & T. Company was a Long [fol. 8824] Lines Company conducting the commercial telephone business and having nothing to do with the licensee contracts or furnishing these services to the associated companies?

A. I cannot say definitely as to that, but the part with which I came in contact indicated that that was so.

Q. That is your best information?

A. That is my best information, yes, sir.

Q. And along side of that company was this American Bell Company which continued to furnish these services——

A. They were both in existence. There is no doubt about that.

Q. And each had its separate function, the one in the commercial telephony, the Long Lines business, and the other in the business of furnishing these services under the licensee contract?

A. As I saw it, that was the case at the time, yes.

Q. And there was no doubt a contract between The American Bell Company and The American Telephone & Telegraph Company which covered these services just the same as did the written contract with the associated companies in the local field, wasn't there?

A. I do not know about that.

Q. You think not?

A. I do not know whether there was or was not.

Q. You mean you do not know whether there was the same sort of contract or you do not know whether there was any contract?

A. You mean in regard to furnishing the services?

Q. Yes.

A. So far as I know, the payment by the Long Lines [fol. 8825] for services is of comparatively recent origin.

Q. How recent?

A. Perhaps six or eight years ago.

Q. Then originally they did not pay for services or for the use of instruments to The American Bell Company?

A. Well, I do not know as to that either, but I do not think they did.

Q. Do you know what arrangement was made between the two companies for the use of instruments?

A. No, I do not.

Q. Did The American Telephone & Telegraph Company furnish its own instruments during that period?

A. Why, I could not say. They never used very many. All they used in the Long Distance services were comparatively few, for operators and test men. Just what arrangement they had for them I do not know.

Q. The original arrangement, the original licensee contract, covered only the instrument service, did it not?

A. Well, I could not say.

Q. Didn't you testify in chief that the original contract merely covered the instrument services?

A. No, I did not undertake to do that. I know that the

services have been furnished and the instruments continuously from the beginning of the business, but as to what was said in the contracts I do not know. I am not familiar with the language of the contracts.

Q. Then you don't know of any contract similar to the [fol. 8826] license contract between these two companies before 1900?

A. No, sir.

Q. Since 1900 the A. T. & T. Company has had entire charge of this licensee contract service excepting that The American Bell Company apparently owned the instruments?

A. I think that is right, yes. That is, they were marked property of that company, and the people who were performing these services, of whom I was one, went on the payroll of The American Telephone & Telegraph Company.

Q. When you went on the payroll of the A. T. & T. Company in 1900, then the A. T. & T. Company had the Long Lines pretty well developed, the country pretty well covered with Long Lines at that time, I assume?

A. No, not in 1900, I wouldn't say it was pretty well covered. You see we had not talked to Denver by that time. As I remember it, we were talking from New York and Boston at that time and to St. Louis and Omaha.

Q. And that organization, that is, the same organization, The American Telephone & Telegraph Company, conducted the commercial business, the Long Lines business, so far as it had been developed, with the licensee service to the associated companies?

A. That is, those were all functions of The American Telephone & Telegraph Company after the year 1900?

Q. Yes, after the year 1900?

A. Yes.

Q. Was The American Telephone & Telegraph Company engaged in any local exchange business at any time during its life that you know of?

A. Why, at one time they operated one little exchange [fol. 8827] down South for awhile. I do not know just why, but with that one exception I should say that they operated no local exchange business.

Q. And the original development of the Long Lines business had the effect of connecting the various local exchanges

of the licensee companies, the associated companies, as they had been developed up to that time?

A. Yes, subject to the limitations of the developments of the art of telephony. As we have extended that we have made it possible to talk from one part of the country to practically every other part. But that was a long time coming.

Q. But the fact is at that time the art had developed to the point, and the demand for service had developed to the point where it was considered wise to connect these various companies by these Long Lines so as to make a unit for telephone service between the different parts of the country?

A. As to the reasons, I cannot say; but what was done was to make it possible as fast as we were able to extend the limits of telephony to make it available to people all over the country to talk as far as possible.

Q. I asked you about the effect of it.

A. Yes, that was the effect.

Q. So that between the licensee contracts which had been made and the Long Lines development which was made at that time, the business was unified in that way, amalgamated into one unit by the combined effect of the licensee contracts and the Long Lines?

A. I should say it was made a unit more by the physical things that enabled that to be accomplished, by having [fol. 8828] standard apparatus and standardized operating methods and the improvements in loading and repeaters, with all of those physical things together it became possible to accomplish this result.

Q. That condition having been reached the company took the step of putting together the units of these Long Lines?

A. I do not know what you mean by that. I have been, as I say, considering the physical things concerned with accomplishing these things, but now as to any corporate relations or contracts I do not know.

Q. I am not asking about any corporate relations or contracts. The effect of building these Long Lines and connecting the local companies was to bring them all into one system, so far as they were connected?

A. Why, yes, if you understand that the way I do. It means, as Mr. Thayer stated in this last annual report, that the Bell System operates practically as a single opera-

tion. That has been the result accomplished by these physical accomplishments.

Q. By these physical accomplishments combined with the tying together by the license contracts and the Long Lines?

A. Well, as I say, I cannot very well discuss it from the contract end, but I should say that that was what the accomplishment had done.

Q. That is what has come about?

A. That is what has come about.

Q. Yes. Has it been the practice of the A. T. & T. Company, in conducting its Long Lines business, to construct its own lines?

A. Generally so.

[fol. 8829] Q. Well, in the Long Lines business, the transmission line is the main part of the physical plant, is it not? The Long Lines Department uses local exchanges for its connections?

A. Yes; it does not own those. Its principal property is in pole lines and wire and, to some extent, in cable.

Q. Those it constructs itself or has its own engineering department?

A. Yes, sir.

Q. Its own construction department for that purpose?

A. Yes, that is right. Of course there are exceptions to all that, where there will be property built and owned jointly with the associated companies, in some cases.

Q. And in some cases it uses the property of the associated companies, does it not?

A. Under some sort of a rental contract.

Q. Under some sort of a rental contract?

A. Yes, that is right.

Q. Now this construction work, and the designing and laying out of plant, is that part of the work of the General Staff?

A. You mean now this work on the Long Lines?

Q. Yes.

A. No. No, that has been carried by a separate organization.

Q. That is a separate engineering department?

A. Yes, they have—I can tell you in just a moment. I cannot lay my hands on it right now, but they have an engineering department of something like 150 or 60 people entirely on the Long Lines work.

Q. Where are they located? Where are the head-
[fol. 8830] quarters?

A. In New York.

Q. Connected in any way with the General Staff Headquarters?

A. Nothing except being within the same building walls.

Q. Entirely a separate organization?

A. Yes, sir.

Q. You are no part of that organization?

A. No.

Q. And have not been?

A. No.

Q. When you say that you render service to the Long Lines Department just the same as you do to associated companies it is this engineering department that you have your relations with so far as they concern engineering questions, is that correct?

A. In the same way that we do with the engineering departments of these associated companies.

Q. And just exactly the same relations?

A. That is right.

Q. But you do not know anything about the contract under which that may be done?

A. No, sir.

Q. Or the arrangement existing?

A. No, sir.

Q. Do you know anything about the way in which the accounts are kept between those two different departments?

A. I cannot tell you that. I do not have any occasion to follow the accounts.

Q. Now you produce here as, I think, your Exhibit 1—no, your Exhibit 2—the picture of the original Bell instrument. That technically is only a transmitter, is it not?

A. Both transmitter and receiver.

Q. It is both transmitter and receiver?

[fol. 8831] A. That is, when they were using those early instruments they had to put the instrument to the mouth to speak into and then to transfer it to the ear to listen.

Q. But it has the characteristics of a transmitter more completely that it has those of a receiver as the art has been developed?

A. No, I should put it the other way around; it has more electrically the characteristics of the receiver.

Q. That is, the original instrument and the one which is generally considered to be the foundation technically and mechanically of the telephone business, is it?

A. Yes, sir; except, you understand, that was a reproduction of it; it was not the original.

Q. I understand.

A. But that was the type of the first instrument.

Q. That was the form of it?

A. Yes, sir.

Q. That is the device that was established as the Bell invention and became the foundation of the industry?

A. That is right.

Q. Well, now, that has been improved and added to, worked out, until we have the instruments that are used at the present day, and, as I understand it, your claim is that that development has been practically entirely by the Bell organization; is that your general position?

A. That is right.

Q. Who was working in the direction of the transmission of speech at about the same time that Dr. Bell produced that instrument?

A. Why, there were a great many other people who were [fol. 8832] working in that direction, and the original patents, as you know, were subject to protracted litigation. I think there were something like several hundred complainants. But the Supreme Court of the United States, as I understand, finally decided in favor of Dr. Bell. There were many, many people who were working at that time or who claimed to have been working at that time.

Q. You have produced here a list of how many patents now in existence?

A. Those figures which I gave you were as of January 1st, 1924, and it covered a list of 4768.

Q. 4768?

A. That is, that was the number as of that date. Is that the date of the list that I gave you? I think it was. If you have the exhibit there it is marked.

Q. I do not happen to have the exhibit.

A. I think that is right though, I think it was January 1st.

Q. Then the number—I cannot find it right now—that

represents all of the patents, does it not, that are controlled by the Bell Company in existence or in effect at the present time?

A. That is right, except, in order that there may be no misunderstanding, that total number includes patents owned or controlled or under which license is held.

Q. Here on page 216 the statement is "As of January 1st, 1924, the American Company owned or controlled or held the license under 4678".

A. It should be 4768.

Q. And there were 2742 applications pending?

[fol. 8833] A. That is right.

Q. Are all of those patents in use in telephone apparatus at the present time?

A. No, sir.

Q. How many of them are; what of them are? Let us point out the ones that are in use.

A. I took that up some time ago with our General Patent Attorney and he told me this, that whereas we can regard it in a sense that they are all in use, that there are about 8 or 900 of them which cover definitely apparatus which is in actual use by the associated companies.

Q. What is the value of the remaining 4,000 or approximately 4,000?

A. A large group of them cover matters as to which we may wish to follow development work in the future and there are some that have been acquired in connection with development work in the past along lines that it has proved wise to turn away from, at least for the time, and sometimes the art takes a turn where those are used. But they were all acquired or taken out in order to protect our development work.

Q. Now what was the number you said were in actual use?

A. Somewhere I should say, from what I gather from talking with our Patent Attorney, between 8 and 900 that are in actual service.

Q. You have no information on that?

A. No; I can give you a list of a hundred of them that are in common use.

Q. Will you give us a list of the patents included in this list which are in use in the State of Ohio in local [fol. 8834] exchanges?

A. I don't know. That would mean a tremendous piece of work to do that. I don't know that anybody could do that short of going around the State and looking at each piece of apparatus and determining the patent mark on it, and the same thing for circuits that are in use. That would keep somebody busy for an awfully long while.

Mr. Gentsch: We object to that statement and ask that it be stricken from the record, because it is purely a conclusion and apparently he don't know—"being a tremendous job"; it may or may not be; evidently this witness don't know. It ought not to be in a record as affirmative evidence.

The Witness: I know to this extent, that I should not want to undertake it without having a good deal of time.

Mr. Gentsch: We object to this statement also.

Mr. Burr: The statement is perfectly proper. The witness certainly knows whether it would take a long time.

Commissioner Poor: I think it is a perfectly proper question.

Mr. Gentsch: If you read that again, with the answer, you will see it is not responsive to the question at all, but it is purely extraneous matter. It is on that ground that I am asking that it be stricken out.

(Question read.)

The Witness: Now, in answering that question——

Mr. Gentsch: Never mind. You are not here to answer the question——

(Question and answer read.)

[fol. 8835] Mr. Gentsch: I am objecting to the indirect way in which the testimony infers that it would take a long while, without his knowledge. That is not the question that was asked. The question was, Could he furnish it? I ask that that be stricken out.

Mr. Burr: As I understand, he is giving his reasons for not giving the testimony.

Commissioner Poor: I think he has a right to explain in a matter of that kind.

Mr. Gentsch: Note an exception.

Commissioner Poor: The motion is overruled.

Mr. Gentsch: Note an exception.

Q. You can give us a list of about a hundred patents that are in common use in the telephone business?

A. Yes, sir.

Q. Will you do that?

A. Yes, sir.

Q. All right. Have you that exhibit here? I haven't a copy of it.

A. I have just one copy of it—oh, you mean this list of patents?

Q. Yes.

A. No, I haven't.

Q. Will you give the list of the hundred or so you can point out that are in use in the telephone business?

A. Would you like me to give it now? I can send you a copy of it or give it to you in another form.

Q. We would like to put it in the record if you can do it now. Now is the time.

A. This would be the agreeable way to do it. I can show you what I have here now.

(Conference between counsel and witness.)

[fol. 8836] Q. You are not able, Mr. Rhodes, as I understand from your own statement, to state that any particular one of these 4768 patents is used in any exchange in the State of Ohio?

A. Not in the sense that I have actually seen that apparatus in the exchange bearing those patent marks, but I am perfectly certain that there are some of these patents that are in use in the State of Ohio, yes.

Q. Are you prepared to state that any one of them or any of them was ever used, pointing them out and naming them to us?

A. Yes, I can do that, because, for instance, some of them cover instruments. I know there are instruments in use in the State of Ohio.

Q. Do you know that there are instruments in use in the State of Ohio embodying those patent features? That is what I want to get at. The evidence would be of no avail unless they are actually used here.

A. They are the types of instruments that are in general use today, and I would be very much surprised if they were not used here.

Q. You do not know that?

A. I would not say that I do not know. You take our repeater circuits, take our central office; these must be in use in the State of Ohio. Patents covering loading coils I know are in use in the State of Ohio. They cover models of the type in use in Cleveland. Now, for instance, there are patents here covering this 144 type of telephone receiver, the latest form of telephone receiver. I know those are used in the State of Ohio.

Q. That is the latest form of the telephone receiver, the [fol. 8837] No. 144?

A. Yes.

Q. Under what patent is that held?

A. Two patents belong to that, No. 1062082 and No. 1063237. Now those both cover the 144 type of receiver.

Q. Specifically what do they cover in that receiver?

A. One of them covers the permanent magnetic steel bar and the soft iron pole piece welded thereto. Another one covers a permanent magnetic steel bar with soft iron pole pieces welded thereto and the cup clamp between them. That is just a broad summary of the patent.

Q. What is the date of that patent?

A. The first one is May 20, 1913, and the second one is June 3, 1913.

Q. Who was the inventor?

A. One is E. B. Kraft and J. N. Reynolds, and the second V. Anderson.

Q. Who are these inventors?

A. I think that they are employes of The Western Electric Company, but both patents are owned by The A. T. & T. Company.

Q. Has there ever been any litigation in reference to those patents?

A. I would not know whether there was or not.

Q. Are there any others that you recall which are in use in the State of Ohio?

A. Well, there is one here applying to quadded cable. I know there is quadded cable in the State of Ohio and this patent must be in use in connection with it.

Q. Where is there any quadded cable?

A. It is used generally for bringing the toll lines into ex- [fol. 8838] changes.

Q. That is not an exchange equipment, is it, though?

A. Well, it is within the exchange frame.

Q. But it is toll line equipment?

A. It is primarily for toll line purposes.

Q. What is the patent you refer to on that?

A. Here is the one, 1064433. Method of reducing telephonic disturbance.

Q. Whose invention?

A. O. B. Blackwell and G. A. Anderegg.

Q. What is the date?

A. June 10, 1913.

Q. Who are those inventors?

A. O. B. Blackwell is transmission development engineer on the American General Staff. Mr. Anderegg is an employe of The Western Electric Company.

Q. Those were issued to those two men jointly, were they?

A. Jointly, that patent was, yes. That also is owned by The American Telephone & Telegraph Company.

Mr. Gentsch: Now we object to Mr. Burr standing up there prompting the witness.

Mr. Burr: If counsel wants to know, I simply said that he had not told the ownership of the patent.

Mr. Gentsch: I object to the prompting of the witness by Mr. Burr. It is not the first time it has happened.

Mr. Burr: I supposed you wanted the truth and the whole truth.

Mr. Gentsch: We will get the truth without you prompt-
[fol. 8839] ing the witness, and we are objecting to that.

Q. Was there another quadded cable patent you referred to? I thought you spoke about more than one?

A. Why, there are, yes.

Q. That are in use in the State of Ohio?

A. I firmly believe so. I cannot say that I have seen the cable with these methods employed but I firmly believe that it is.

Q. How did The American Telephone & Telegraph Company acquire this patent that you have just referred to?

A. Why, it acquired Mr. Blackwell's share of it because he was an employe of the Staff.

Q. Yes.

A. And I don't know in the case of Mr. Anderegg's share. I think there is an arrangement with The Western Electric Company that a certain kind of patents that affect absolutely speech transmission become the property of the American Company.

Q. Are there any others there that you know that are in use in the State of Ohio?

A. Here are some on loading. I know that loading coils are used in exchange circuits in places like Cleveland, in trunks between the offices in the city, and there are some here that cover recent improvements.

Q. What are they?

A. Well, here are four covering type of magneto core that employs the powdered dust. You remember I showed you on direct examination the cores or coils built up out of rings that could be broken. There is a group of four patents covering those. They are 1274952, 1286965, 129-
[fol. 8840] 2206, 1297126.

Those are owned by the American Company.

Q. Who are the inventors?

A. J. B. Speed, G. W. Elman, J. C. Woodruff; and G. W. Elman in the fourth.

Q. Who are they?

A. I think they are employes of The Western Electric Company.

And thereupon the further hearing of this matter was adjourned to Tuesday Morning, April 22nd, 1924, at ten o'clock.

[fol. 8841] Tuesday Morning Session

April 22nd, 1924.

And also FREDERICK L. RHODES, resuming the stand, for further cross-examination, continued his testimony as follows:

Cross-examined by Mr. McConnaughey:

Present:

Same counsel as at previous session, and J. E. Kinnison, counsel for the City of Canton, Ohio.

Commissioner Poor: Gentlemen, we will resume.

Q. Mr. Rhodes, when we recessed yesterday, you were telling us something about patents. Have you that sheet before you?

A. Shall I continue?

Q. Yes. Now, what was the patent you were just testifying about? Were you through with that?

A. You had asked me as I remember it to name some of the patents which were used.

(Record read.)

Q. Now, can you name any other patents in your list which was filed here as an exhibit which cover devices or apparatus that are in common use in the State of Ohio?

A. Yes, sir.

Q. Go ahead. Now, will you do this, to save time, give [fol. 8842] the number of the patent, the date and the inventor and his connections and what the patent covered.

A. I will next give two patents which cover improvements in transmission and signalling, which are used in Number 550 type of private branch exchange and in other types of private branch exchanges. One of these is 1175112. The patentee is H. M. Bascom. He is a member of the General Staff of the American Company. The date is March 14, 1916. The other patent is 1232507, patentee H. L. Darrah. The date of that patent is July 10, 1917. Mr. Derrah is an employee of the Western Electric Company I believe.

Q. Now, those are two related patents, are they? You speak of them together?

A. Yes, sir.

Q. Because they are related?

A. Yes.

Q. What is the particular function of the devise they cover?

A. They cover the transmission and signalling systems employed in this particular type of private branch exchange.

Q. Private branch exchange?

A. Yes.

Q. And that apparatus is manufactured by the Western Electric Company I assume?

A. Yes.

Q. Did you give the dates?

A. Yes.

Mr. Burr: May it be understood that unless the witness otherwise states that these patents are all owned by the American Company?

The Witness: The first is owned by the American Company and the second is owned by the Western Electric Company.

[fol. 8843] Mr. Burr: It would be my suggestion that he differentiate in each case.

The Witness: I will do that.

Q. Was Mr. Bascom a member of the General Staff at the time of that invention?

A. Why, I cannot state from memory.

Q. How long has he been connected with the General Staff?

A. Well, if I knew that, I could tell. But I don't remember accurately. He came to us from the—I think from the New York Telephone Company. Now just as to when that date was, I don't remember.

Q. All right. Now is that a device that is used in practically all of the private branch exchange installations?

A. In all of that particular type, the 550.

Q. What is that type generally?

A. It is one of the standard types, I can't tell you where it could be used in this territory, but if is a type in common use.

Q. All right, what is the next?

A. 1231629, H. H. Lowrey, July 3, 1917, owned by the Western Electric Company, and it covers a switchboard section constructed in two parts and is used in all number 1-D switchboards.

Q. What is a number 1-D switchboard?

A. It is a type of smaller size and special form of the Number 1 common battery switchboard.

Q. In common use?

A. Oh, yes.

Q. Now, who was this inventor?

A. H. H. Lowrey.

Q. What is his connection?

A. Why, I can't state accurately, but I presume he was [fol. 8844] with the Western Electric Company.

Q. Not with the general Staff?

A. I think not. You know that many of these specific patents are owned by the Western Electric Company and controlled through our patent relations with the Western Electric Company.

Q. What are your patent relations with the Western Electric Company?

A. Well, now, I will have to describe that at no little length. The Western Electric Company is granted by the

American Company exclusive right to make and sell appliances other than telephones under patents owned and controlled by the American Company. The Western Electric Company pays all costs of such patents and assumes all royalties and obligations, and also agrees to sell to the associated company at prices that are not exorbitant or unreasonable and that are uniform to all associated companies.

Now, the American Company grants to the associated companies the right to use appliance patents which the American Company can so license, and that includes these patents of the Western Electric Company.

Q. You are reading from something there are you?

A. I am reading from some manuscript notes of my own.

Q. Does that purport to quote a contract—or is that——

A. It is an abstract of an old contract.

Q. Of a contract now in force?

A. I believe so.

Q. Will you produce that contract?

A. No, I haven't it.

[fol. 8845] Q. It can be produced?

A. I presume it can.

Q. Will you get a copy of it for the record?

A. I will do the best I can.

Q. What do you mean by that?

A. I will go back and report to my superior officers, that I have been asked for it.

Q. All right, now, what is the next patent that you have in mind that is in common use in the State of Ohio to your knowledge?

A. There is one covering a telephone service observing system, Number 1245490, patentee, Mr. E. C. Molinna, who has been for many years a member of the General Staff of the American Company. The patent is owned by the American Company and the date is November 6th 1917.

Q. What is the use of that device?

A. It covers circuit arrangements involving a means of service observing of a plurality of lines, in which the lines are connected automatically to a service observing trunk, one line at a time, excluding all the others. The purpose of it is for use by the traffic department of an associated company to make the necessary observations to keep informed as to the grade of service that is being furnished.

Q. Is it a device under this patent that is in common use in the exchanges for that purpose?

A. Yes.

Q. What is the next?

A. Number——

Q. Just a moment?

A. Yes.

Q. Is this a specific device that is manufactured by the Western Electric Company?

A. It is involved in apparatus made by the Western [fol. 8846] Electric Company, yes.

Q. All right?

A. Now, I have another one—Pardon me. I won't give this. It soon expires, in a few months. There is a patent on a switch key, Number 1012125, patentee, Mr. E. B. Craft, for many years connected with the Western Electric Company, now their chief engineer, dated December, 19, 1911, owned by the Western Electric Company. This patent covers the standard method of mounting the contact spring on the frames of keys. It covers means for securing the springs together as a unit, and independent means for attaching the units to a rib supported between the two legs of the frame. It is the type of construction which is used on practically every type of key unit.

Q. And is embodied in devices manufactured by the Western Electric Company?

A. Yes. Now, I have one on a key shelf and base, Number 1050520. The patentee is E. B. Craft, the same as in the previous patent. The date is January 14th, 1913. The patent is owned by the Western Electric Company and it covers the Western Electric Company's universal type mounting for keys in a key shelf and has claims covering a shelf, having an opening therein, a key base supported therein by means which leaves an unobstructed opening therein, and locking means carried by the key base. It is the standard mounting for all universal type keys manufactured by the Western Electric Company.

Another patent on the subject of a flexible conductor, Number 1116090, patentee D. T. May. As far as I know, he [fol. 8847] is an employee of the Western Electric Company. The date is November 3rd, 1914. The patent is owned by the Western Electric Company and covers the construction of all switchboard cords manufactured by the Western Electric Company since 1914.

In another one the subject is an electro-magnetic relay. The number is 1156671. The patentee is E. B. Craft. The date is October 12, 1915. The patent is owned by the Western Electric Company. It covers a relay in which the armature is supported at one end of an electro-magnet core and swings laterally toward and from the other end of the cord. Contact springs are mounted at the rear end of the core and are controlled by the armature. That patent covers all relays of what is known as the flat core type, manufactured by the Western Electric Company.

Q. And they are used in long distance lines generally in the State of Ohio?

A. They are used in local switchboards.

Q. What is the purpose of that relay?

A. To open and close contacts. There are a great many contacts involved in the operation of the switchboard. As, for instance, when the subscriber removes his telephone from the hook, there is a relay which operates to close a contact and light a lamp, and when the operator inserts the answering plug in the answering jack another relay operates to extinguish the line lamp. Those relays for a number of years have been of this improved and more economical [fol. 8848] type.

Q. This Craft is the same man you mentioned a while ago?

A. The same one, I can go on with a large number more of these.

Q. Let's have a few more?

A. There is a telephone pay station patent, Number 917742, patentee, G. A. Long. And I don't know who he works for, or did. The date is April 6th, 1909, and the Western Electric Company holds a license under this patent. It covers a resonant circuit, which transmits the tone from a gong to a transmitter through a metallic medium and thence to the operator. It is used in the Number 50 coin collector.

Q. Is that Number 50 the one that is in common use at the present time?

A. It is the multi coin pre-payment type of coin collector, very generally used, yes. Now, I have several more on this coin collector. Number 1043219, patentee, O. F. Forsberg. The date is November 5, 1912. The patent is owned by the Western Electric Company. It covers the trap mechanism used in the Number 50 pre-payment coin collector, which holds the coin in suspense until the call is completed, and then distributes it to the proper chute.

Another patent on the same inventor, Number 1117485, November 17th, 1914, owned by the Western Electric Company, covers the magnet mechanism which operates the trap mechanism used in the Number 50 prepayment coin collector.

A patent on a telephone transmitter, Number 1050304, patentee C. E. Scribner, connected with the Western Electric [fol. 8849] Company, date January 14th, 1913. The patent is owned by the American Company. and it covers the centrally damped structure which is now employed in the Number 323 type of transmitter.

Q. Is that Number 323 type one that is commonly used?

A. It is in wide use now.

Q. Well, is it the current one that is being used at this time?

A. Yes.

Q. Is Mr. Scribner the chief engineer of the Western Electric?

A. He was until he retired. The 323 instrument came into general use about 1918. About two years subsequent to that time there began to come into use the 337 type of transmitter, especially adapted for long common battery substation loops, which employs a button of special design. That was covered by patent Number 1132613. The patentee is J. C. R. Palmer. The date is March 23rd, 1915, and the patent is owned by the American Company.

Q. Who is Mr. Palmer?

A. I don't know definitely. I think he was an employee of the Western Electric Company.

Q. That device is one that is manufactured by the Western Electric Company?

A. For the American Company, yes. Now there is a protector patent Number 1222350, Patentee H. G. Bandfield. The date is April 10, 1917. Owned by the Western Electric Company. It covers the new porcelain type protector block which is now standard in the bell system.

Q. What is a protector block?

A. It is a device used at the subscriber's station, the [fol. 8850] purpose being when a foreign current, an electric light or power current, suddenly gets on the telephone line, to operate by arcing the ground and protecting the subscriber's premises and the telephone instruments there. It also functions in the event of lightning discharges.

Now there is another patent covering the specific forms of these protector blocks. They are known as the Number 26, 27, 28 and 29 types. That patent is 1324334. The patentee is H. Boring. I presume he is an employee of the Western Electric Company, but I am not certain. The date is December 9th, 1919. And it is owned by the Western Electric Company.

Now, I have a long list of numbers only of patents applying to switchboard apparatus and switchboard circuits. My information on this is not as complete as the information that I have just given you, but broadly speaking these cover types of switchboards which are known as the Number 1——

Q. Now, Mr. Rhodes, if you are not able to give us who was the inventor and who owns the different devices and what they are used for in the detail you have given us about the others, we do not care for them.

A. I can only give you a long list of numbers of these patents without the other information.

Q. That would not be very intelligible to us outsiders I am afraid. Are those that you have named the ones you have in your mind as the patents in the most common use in the [fol. 8851] State of Ohio?

A. They are representative of the others only.

Q. They are representative, yes.

A. It is not by any means a complete list, and I did not anticipate that you would want that information and I did not come prepared to give it. But if you wish something on that, a long list can be prepared giving this information you wish in detail on these patents.

Q. I want to refer to your testimony on page 212. On page 214, I should say, where you refer to the practice of the A. T. & T. Company of granting to other people the privilege of making use of the inventions which you have set forth in your list, and you have named one or two typical instances of where that practice has been followed. Now what is the practice of the company with reference to the permission of other companies to use telephonic devices that are covered by patents? The ones that you named were not strictly speaking telephone devices as I recall?

A. No. Why, in some cases, licenses have been granted. I remember that a number of years ago an arrangement was made with the automatic electric company in Chicago, whereby they were granted the right to use such of the

American Company's patents as pertained to the system of machine switching, known as the step by step method, which they were then using, and they granted to the American Company the right to use all of their patents involved in machine switching.

Q. Was that in settlement of patent litigation?

[fol. 8852] A. I couldn't tell you that.

Q. Does that company manufacture any equipment for the American Associated Companies?

A. Yes, a large amount.

Q. A large amount of automatic equipment?

A. Yes.

Q. Practically all of the automatic equipment used in the system is manufactured by that company at this time?

A. No, just the machine switching apparatus of that particular type.

Q. What particular type?

A. Known as the step by step.

Q. What other type is used?

A. The panel machine switching type.

Q. Isn't the use of the panel switching type rather exceptional in your system?

A. No, it is going in very rapidly in many places.

Q. In how many places in the State of Ohio is the panel switching being used?

A. I don't think it is being used anywhere in Ohio.

Q. No, nowhere in Ohio. Now does the automatic company manufacture automatic equipment under your patents, machine switching equipment, for the general public?

A. Why, it manufactures this same type of equipment for the general public.

Q. Under your patents?

A. I presume so, because some of the machine switching patents that we have rights under are fundamental.

Q. Are there any other instances of that kind that you [fol. 8853] have in mind? I think you have answered the question.

A. Very well. No, there are no others that I have in mind, although I would not undertake to say that there are no others.

Q. What is the Western Electric Company? What is its function in the American Telephone and Telegraph system?

A. It has two main functions. One, as a manufacturer

of telephone apparatus, and the other as a purchasing agent and distributor of supplies for the associated companies.

Q. As a manufacturer, does it sell its product to others than the associated companies?

A. Very largely, yes.

Q. And as a purchasing agent does it purchase materials and pass them on to others than the associated companies?

A. Well, I don't know as to that. They do a large business in electrical supplies outside of the Bell system.

Q. Well, does that electrical supplies cover articles that they do not manufacture?

A. Oh, yes.

Q. But purchase from other manufacturers?

A. Yes, very largely, as is the case in their purchasing and warehousing work for the associated companies.

Q. Do they also maintain and operate an engineering department, research and development department?

A. The Bell System laboratories so-called are in the building of the Western Electric Company and the relation between that department and the General Staff is a very close relation, yes, sir.

[fol. 8854] Q. Now, in the work of that laboratory who has the direction as to what work shall be done and what result shall be sought?

A. In the portion of that work applying to the Bell system, the direction as to what is done rests with General Carty who is vice-president of the American Company in charge of development and research.

Q. Is there a part of the Western Electric laboratory that does not relate to the Bell system?

A. Yes, they do work on things that are not included in that.

Q. What products?

A. Washing machines, vacuum cleaners.

Q. That is the general electrical appliance business which you referred to a while ago which has no relation to the telephone business?

A. That is part of it.

Q. This covers facilities for development of that sort of thing as well as the telephone industry.

A. Yes, they do something of that on their own hook that the Staff is not interested in.

Q. What is the magnitude of the engineering laboratory

of the Western Electric Company? How many men do they employ in that department?

A. Why, I should say their total employees run something over three thousand. They are not all engineers, but that is the total force.

Q. You would distinguish in that force between engineers of varying grades and clerks and assistants and all that sort of thing, as you did in describing the A. T. & T. research laboratory?

A. Yes, that is right. They are all included in that figure.

[fol. 8855] Q. Probably about the same proportions?

A. I should think very likely, yes.

Q. About the same class of men engaged in the work?

A. Why, they are men of equal ability.

Q. That is what I mean?

A. Their training is perhaps along little different lines.

Q. In what way?

A. Why, a great many of the engineers of the Staff are men who have specialized in consulting engineering which we do for the associated companies, the men who are commercial engineers and the traffic engineers.

Q. I see?

A. Now, the engineer on the Staff of the Western Electric Company are a different type, in that they are more laboratory specialists and experts in apparatus design.

Q. Now, in the A. T. & T. Staff, how many men are there engaged particularly in development and research work on apparatus development as distinguished from commercial engineers and the other departments of engineering which you have just mentioned?

A. I could answer that more intelligently if I had a copy of the exhibit showing the organization diagram of the department of development and research. I haven't a copy of that, I am sorry to say.

Mr Burr: It is in the record.

Q. 357 isn't it?

A. That is the total number of employees in the department of development and research. They are not all engaged on apparatus design.

Q. How many of them are engaged on the development [fol. 8856] of telephone devices or improvements; put it that way?

A. All of those people particularly are engaged on that subject.

Q. 357 then in the A. T. & T. laboratory are engaged in that kind of work?

A. That is not in the laboratory. That is in the department of development and research.

Q. And the Western Electric Company has three thousand and how many?

A. I don't know. Something over three thousand.

Q. In a department doing similar work?

A. It is not similar work, but it is supplemental work, work that is coordinated with work that these 357 people are doing.

Q. Just exactly how is this work divided between those two organizations?

A. That was covered pretty fully in my direct testimony, but to repeat it, the engineers on the General Staff are maintaining very close relations with the associated company, operating in the field. They undertake through this contact, which is also established through our department of operation and engineering, involving some five hundred other people—They undertake to develop in the first instance what should be developed to best and most economically meet the requirements of the telephone service to the public. Then, when a new piece of apparatus is required for that purpose, the conditions which it must meet are determined by the general staff and transmitted to the Western Electric Company, who undertake to meet these conditions in a specific piece. Throughout the mechanical and [fol. 8857] electrical development of that piece of apparatus the Staff engineers and the Western Electric Company engineers are in close touch. When the Western Electric Company has completed a design, the General Staff engineers consider that and test it, if necessary, making a trial under actual service conditions, and if it turns out to be the best thing for the purpose, it is recommended to the associated companies, together with such information as is necessary to insure that it is installed and operated and maintained in the best way.

Q. Is it fair to say that the A. T. & T. Research Department, development and research department, concerns itself primarily with matters of scientific principle, whereas the Western Electric Company concerns itself primarily with

matters of form and design in reference to these different devices?

A. That is true inasfar as it goes. It does not mean that that is the entire function by any means of the General Staff.

Q. I appreciate that?

A. But it is true as far as it goes. And they are not limited wholly to scientific questions, because they are intensely interested in the practical situations which the apparatus must meet also.

Q. Does the Western Electric Company Research Department do any independent work which it initiates in the way of investigation of new devices?

A. I think it does in connection with its outside business.

Q. But not in connection with the telephone business.

A. In connection with the telephone business, that is all [fol. 8858] done with the co-operation of the General Staff.

Q. Now, you stated I think that out of your budget of three and a third million you planned to spend this year a million and a half to be paid to the Western Electric Company for work which it was to do for this department?

A. Yes. You remember that was solely the budget of the department of development and research.

Q. Yes, that is what I understood?

A. That is right. Now that means this. The Western Electric Company is re-imbursed in this way for work which they do which does not result in apparatus which they make and sell. It covers work which they do on the development of telephone instruments, and it covers work which they do on all sorts of materials and appliances which are manufactured outside the Bell system and which we ask them to test and determine the properties of these materials.

Q. It does not cover anything which they subsequently put to production for sale to the associated companies?

A. That is right.

Q. Does it cover the things that the two departments work on and finally reject as unfit for use for any reason?

A. I am not sure as to that. Most of that work that we do—Examining matters which are rejected does not come to the laboratory stage—A great deal of it can be determined without that.

Q. If there was anything of that kind, it would be negli-

gible as far as the Western Electric Company expense is concerned, would it?

A. I should say that they would not be greatly involved [fol. 8859] in it.

Q. This list of over four thousand patents which you have filed here, does that represent so far as you know, practically all of the patents affecting the art of telephony that are in force at this time?

A. It represents those that are used in the Bell system.

Q. Are there any other important patents or patents outside of the Bell system that are owned by other people or controlled by other people?

A. I think there must be patents owned by independent manufacturers so-called, covering such appliances as they make and sell.

Q. Have you in mind any important examples of that kind, covering devices that are of great value in the telephone art?

A. No, I am occupied practically exclusively in Bell system work.

Q. You mean simply to say, if there are such, you do not know about them?

A. Yes, sir.

Q. You have an appropriation of three and one-third million dollars for the year 1924 in your department?

A. For the department of development and research, yes.

Q. That is the division or department for which you are personally responsible?

A. No, I am responsible for one section of it only.

Q. I keep getting you a little too high here, don't I?

A. You are promoting me.

Q. I think you deserve it. Are you able to state how that money will be spent this year according to the budget [fol. 8860] estimates?

A. Simply that it will be spent on the development work of various kinds running through the whole department.

Q. Don't you develop your budget in detail?

A. Yes. We make estimates of what various individual jobs are expected to cost and we develop it by comparison with our expenditures in the various lines of work for the past year and take account of such of that work as is carried over, and also of the new projects which we expect to initiate.

Q. And taking all of those things into consideration, you

expect to spend three million, three hundred thousand dollars approximately?

A. Approximately.

Q. In the year 1924?

A. Yes, sir.

Q. Of which a million and a half you expect to pay to the Western Electric Company for the purposes which you have recited a few minutes ago that you expect to pay them for?

A. That is right, yes.

Q. So that the work that will be actually done in your department, in the department for which this three and one third million dollars is appropriated, is one million, eight hundred dollars.

A. It is the difference between those two sums.

Q. Now, when you have done all of this work and sent out all of these specifications in bulletins and instructions and everything of that sort, I understand your testimony to be that the use of these various suggestions is entirely up to the Staff of the associated company, the Ohio Bell Company [fol. 8861] in the case we are now considering.

A. Yes, sir, that is right.

Q. Have you in mind any instances in which the Ohio Bell Company officers or engineers have failed and refused to follow any of the practices recommended by the General Staff?

A. I haven't any information as to that, one way or the other.

Q. You do not know of any instances where that has ever happened?

A. No.

Q. Do you know of any instance where any associated company has ever refused to follow any recommendation or practice recommended by the General Staff?

A. Yes.

Q. Recite those instances?

A. Well, within the last month in St. Louis, they had a little trouble there from leakage from what are known as Number 14 cable terminals, and we sent them some recommendations as to what we thought would cover the trouble, and they had some ideas of their own which they proceeded to put in practice.

Q. Did they stop the leakage?

A. I don't know yet.

Q. Were their ideas different from the ideas of the General Staff?

A. Yes, sir.

Q. Contrary to the recommendation of the General Staff?

A. Yes.

Q. Have you any other instances in mind?

A. Why, I recall a number of years ago in Chicago, quite a long time ago, where they had been operating a distributing system using cross-arms and open wire in the alleys, [fol. 8862] and we recommended the change of practice there to the use of the cable system, with frequent distributing terminals, and they felt that their system of distribution was better and they continued for quite a little time using it, before they finally decided to follow the recommendations of the General Staff, but that decision was their own and it was not under any compulsion.

Q. They finally did decide to follow your recommendation?

A. They did, yes.

Q. Have you any other instances in your mind?

A. No, I don't think of any now, but that is typical of what happened.

Q. That is, it is usual that you finally agree that the General Staff is right?

A. We do not agree to that, but in general the associated company does, yes, sir. Their experience has been that what we recommend is the right thing. We would not be doing our job right if it did not work out that way.

Q. I think that is correct. Now the American Company has acquired patents by purchase and by license as well as by invention of its employees as you have stated?

A. That is right.

Q. From what fund does it pay for the patents which it acquires?

A. I am sure, I don't know.

Q. You don't know, because you are not familiar with the accounting system?

A. I am not familiar with the accounting system and I have never had anything to do with the actual mechanism of purchasing patents.

[fol. 8863] Q. That is done by what department?

A. By our patent department.

Q. You have testified to a large saving in a number of

instances by various things that have been developed by the American Telephone and Telegraph Company's Research Department?

A. Yes, sir.

Q. The thing that I think of just now is in the standardization of supplies, when you speak of the saving of fifteen thousand dollars per year in lead pencil.

A. Well, that was just a trifling example.

Q. Yes, I understand, but I just want to get the information as to how you determine, by what standard of comparison you determine that saving of $15,000.00, comparison of what thing with what thing, or how did you get at the amount?

A. That was done by our mean who was in charge of that particular end of the standardization, and this is a case, I think, where a large number of types were replaced largely by one type, and he figured for a year the cost of buying these large members of types in small lots as against buying the one type in a very large lot.

Q. Is that a saving in an actual year's business?

A. No, sir.

Q. Or a calculated saving based upon an assumed typical year?

A. It was based on a typical year. That is my understanding, yes.

Q. Is that also true of the saving of $250,000.00 a year [fol. 8864] in paper?

A. I think so.

Q. For certain purposes?

A. Yes, sir.

Q. Are the savings that you have stated in various details based upon the same sort of calculations?

A. No, the plant savings that I have made have been based on general plant statistics for the entire Bell system. I have in full detail, I think, and I can show the entire calculations upon which each of those plant savings that I testified to are based, and I can take any one or all of those if you wish and go through it in detail to show you how the results are arrived at.

Q. Let us take the matter of cable to which you testified on page 244 and several pages following that.

Mr. Gentsch: For the purpose of the record, I would like to object to this line of evidence on the ground that if

our contention is true, that there is no contract and the A. T. & T. is the sole owner or the owner of the Ohio Bell, that evidence of savings could not be considered by this Commission as affecting the validity of this contract or the amount of return which the company receives from it, it being our contention that the A. T. & T. would be limited in its return to the cost of the articles furnished or the service rendered, and that the burden is upon them to produce such evidence as will satisfy this Commission as to what those costs are.

Commissioner Poor: By the way do I understand, Mr. Gentsch is objecting to this line of cross-examination?

Mr. Gentsch: Yes, on that ground. I do not want to [fol. 8865] interrupt, but I felt that I ought to at this time. At the conclusion of this cross-examination, I am going to ask that all of the testimony given by this witness with reference to alleged savings be stricken out as being immaterial and irrelevant to the issue here, for the reasons that I have stated.

Commissioner Poor: The cross-examination is proper relating to the matters testified to in chief.

Mr. Gentsch: I understand, but I am making this objection for the record.

Commissioner Poor: I see.

Mr. Burr: In the so-called Cleveland Telephone Case, reported in 102 Ohio State, page 341, exactly the same contention was made on behalf of the City of Cleveland as is now being made by the gentleman from Cleveland, and the Ohio Supreme Court did not take the matter seriously and did not say that the cost to the American Company must be shown or that the amount paid by the Cleveland Company for the services must be limited to the cost of those services to the American Company. Those issues were thoroughly threshed out in that case, and our Supreme Court held that if the contract was one which the Cleveland Company had the right to make, that in a matter of that sort, involving business judgment, it was for the Board of Directors of the Company to determine, with the limitation of course that the obligation of the two companies could be scrutinized, as was done in that case, and no fault found with it.

[fol. 8866] Mr. Gentsch: In reply to Mr. Burr, without intending any disrespect at all, I beg leave to differ with him as to the extent to which that matter was threshed

out in that case. At any rate, Mr. Burr, it is not going to go by default in this case and we are going to have the evidence here before we get through. So there isn't going to be any default here, whatever occurred some place else.

Mr. Burr: Are you suggesting that the gentleman who represented the City of Cleveland at that time allowed the matter to go by default.

Mr. Gentsch: I am just saying this, as I stated here yesterday, you fellows have been too smart for all of the rest of us.

Mr. Burr: That was before I got into the telephone business.

Mr. Gentsch: No, I am taking my hat off to you. You are not missing anything. As my friend Shuler said here a couple of weeks ago, they better put you on the stand. You would make a better witness than any of your witnesses. That is the way I look at it, Mr. Burr. I have just got that much respect for you. But in that case, just as was said here yesterday, what is everybody's business is nobody's business. And as a general thing, the people, the attorneys, without any disrespect to them—I do not mean that at all, but I do say that we on this side of the table, and I include myself—Are all at a disadvantage in a hearing of this kind. This part of the work is something that is new to most of us, and we have to pick up the strands as [fol. 8867] we can. The fact is that a hearing of this kind has such tremendous ramifications that it is a liberal education in itself to get ready to try it. And then you can't do it, especially so in view of the character of the evidence which my friend, Burr, and his associate counsel always introduce in cases of this kind. It is introduced in a form you cannot cheek, and introduced in that form so that you cannot check it. I have been struck in the reading that I have been doing in the last four or five months—And I have gone through record after record—I have been struck by the uniformity of the testimony of the witnesses. My friend Rhodes here is one of their star witnesses who goes from place to place. And you may take his testimony here and take it in Illinois or wherever you want to go that he has testified, and he has got it just like Mr. Burr, by rote. The testimony in one case is just the same as in the other and the people on this side of the table in the majority of cases have not the opportunity or the time to go into it and

check it, and they get away with a mass of this stuff, and they got away with a mass of that stuff in the 102nd Ohio State, through no fault of the attorneys for the city, and I am not casting any reflection on them at all; I have the highest respe for them; but they had a job that was too big and they did not have the time or the money or the assistance to do it.

Commissioner Poor: After the argument, including the exchange of pleasantries, we will overrule the objection [fol. 8868] to the testimony and preserve the exception.

Mr. Gentsch: I just wanted it for the record. Note an exception.

Q. Now, Mr. Rhodes, tell us how you figured the saving on the improvements in cable?

A. I had the data from our comptrollers reports.

Q. First let me ask you this as a sort of a starting point: Did you put in the record a gross figure of savings in cable?

A. Why, I don't remember whether I did not.

Q. Then without looking back to determine it——

A. I can tell you what I should have said if I had been asked that question.

Q. All right, tell us about that?

A. That if the so-called fine wire cable had not been employed in the plant of the Bell System, but the 19 guage cable, which had been used prior to that time, had been employed up to the present time, and as great a circuit mileage utilized as is the present case in the plants of the associated companies, that the total expense of the plant would have been close to a hundred million dollars more than it has been.

Q. Now, state how you determine that difference?

A. The figures I base it on were as of December 31, 1921. I had the total circuit mileage in cables in the Bell System, divided between aerial cable and underground cable. Would you like those figures?

Q. Yes, give those to us?

A. In aerial cable three million one hundred and ninety-[fol. 8869] five thousand, two hundred and fifty-six, (3195256).

Mr. Burr: What?

The Witness: 3,195,256.

Mr. Burr: What?

The Witness: Circuit miles in aerial cable. In underground cable, 8,779,352. That is circuit miles of wire in nndergrouud cable. The total of those items is 11,974,608. Now, since those calculations which I am proceeding to make were not intended to include savings due to 900 pair 22 *guage* cable or savings due to 24 *guage* cable, it was necessary from this figure of circuit mileage to subtract the circuit mileage for those types of cable. That it was possible to ascertain accurately from the cable shipments made by the Western Electric Company to the associated companies, and the figures which I have there, are 900 pair, 22 *guage* cable 1,480,000 circuit miles, all of which I considered was in underground cable; five and six hundred pair 24 *guage* cable, 146,000 circuit miles, of which in my best judgment about 15 per cent was in underground cable. In 900 pair 24 *guage* cable, 27,000 circuit miles, all of which I took in underground cable. Of 1200 pair 24 *guage* cable, 497,000 circuit miles, all of which I took in underground cable. The sum of those items being 2,150,000 circuit miles. Now, they gave me for figures for circuit mileage in 19 *guage* and 22 *guage* cable, excluding 900 pair, the following figures. In aerial cable, 3,071,256 circuit miles. In underground cable 6,753,352 circuit miles. A total of [fol. 8870] 9,824,608. Now from figures based on various inventories made for a number of Bell System properties——

Q. Inventories, for what purpose?

A. Inventories that have been made in connection with rate case proposition.

Q. Yes.

A. And from figures which I had showing the Western Electric Company's output of cable for several years back, I arrived at the figure of about 80 per cent of the above circuit mileage in aerial cable being 22 *guage* and about 65 per cent of the above circuit mileage in underground cable being 22 *guage*. Applying these percentages to the circuit mileage figures gave me for the circuit miles of 22 *guage* cable, exclusive of 900 pair, 2,457,000 in aerial cable and 4,389,000 in underground cable, a total of 6,846,000.

[fol. 8871] Now, from the same sources from which I obtained those percentages I arrived at figures for the cost per circuit mile for 9 and 22 *gauge* cable and found that a conservative figure for the saving per circuit mile by

using 22 gauge cable instead of 19 gauge cable was $10.00 per circuit mile for both aerial and underground cable. Applying this figure of $10.00 to the circuit mileage of 6,846,000 gave me a figure of a little over $68,000,000.

Q. That covers the saving on construction that has actually taken place?

A. For the cable alone. There is a duct saving which goes with it, which accounts for about $30,000,000 more, which I could go over in the same detail that you wish it.

Q. Go ahead and go over it. Give us that also.

A. All numbers of circuits above 300 and up to and including 600, if in 19 guage cable, would have required two cables and hence two ducts, whereas these numbers of circuits require only one 22 guage cable and only one duct. Now, about 77 per cent of the No. 22 guage underground circuit mileage is in cables larger than 300 pair. The average size of cable for this circuit mileage in cable is about 470 pair. So applying this percentage of 77 to the previously obtained circuit mileage figures gave me 3,380,000 circuit miles of 22 guage cable in cables larger than 300 pair. Dividing the figure which I have just given by 470, which is the average size of the cable as regards numbers of circuits, gave me 7,190 miles of duct saved. Now, as the plant runs on the average with about two ducts per cable, the miles of ducts saved in the system has been [fol. 8872] 14,380. A fair average figure for the cost of a foot of duct is about 40 cents. Applying this to the mileage arrived at above gives saving in first cost of $30,400,000, which added to the cable saving previously obtained of $68,400,000, gives a total of $98,800,000, which was the basis for my statement that the saving had been nearly a hundred million dollars.

Q. Now, does that calculation contemplate the cable in place or simply the material cost?

A. The cable in place.

Q. Is there any saving corresponding to the duct saving that applies to the aerial cable?

A. Why there is in a way, yes. I did not take that into account, but there is a saving, because of the smaller cables you need less expensive suspension strand; it has to be less strong.

Commissioner Maullar: Mr. Rhodes, is this improved cable available to the independent companies?

The Witness: Yes, it is sold to independent companies, after it is developed for the Bell System and the Bell System have the use of it.

Commissioner Maullar: It is being used by independent companies as well as the associated companies.

The Witness: Yes, sir.

Commissioner Maullar:

Q. How does the price to the independent companies compare with that to the associated companies?

The Witness: My understanding is it is considerably higher to independent companies than to associated companies.

Mr. Shuler: I move that that be stricken out Your Honors for the reason that the witness shows by his answer that he [fol. 8873] does not know, that is his understanding. It is merely hearsay and incompetent, and I move that it be stricken from the record.

Mr. Gentsch: I also move that it be stricken from the record for the reasons which I gave a while ago.

Mr. Shuler: It is purely hearsay evidence, absolutely incompetent.

Commissioner Poor: Since the answer was made responsive to a query from the Commission, it will not be stricken out. Of course, the Commission realizes that the objection may go to the weight of the testimony given. It is merely his understanding and has no probative value.

Commissioner Maullar: It is merely his understanding. The question as he answered it was that it was his understanding of the price, and it has no probative value.

Commissioner Poor: If you want to reserve exceptions there you may do so. It will not be stricken out.

Mr. Shuler: Yes, we want to reserve the exception.

Q. Other manufacturers than the Western Electric Company do manufacture this cable, however, do they not?

A. They manufacture 22 gauge cable up to 600 pair. I am not sure that they make 900 pair, and I never heard of any 1200 pair cable, 24 gauge, made by other manufacturers except the American Electrical Works at Providence, which has made cable for the New England Company, and I think

the Western Electric Company undertook to show them how to make this 1200 pair cable for that purpose.

Q. Do you know how their prices compare with the [fol. 8874] prices of the Western Electric Company for this fine wire cable?

A. Except that the Western Electric Company does sell it in the open market in competition with these other manufacturers.

Q. You do not know the price?

A. No, not of my own knowledge.

Q. Now, the 22 and 24 gauge cable is being used pretty generally in all new installation, is it not?

A. Wherever it is suited for transmission reasons, yes.

Q. What determines whether you use the fine wire or the 19 gauge?

A. The finer the wire the more economical is the installation. Therefore, it is used as far as it can be within proper transmission limits. For instance, if the 24 gauge cable were used in the cable carrying subscribers' lines four or five miles in length, the transmission would be weakened beyond what would be a satisfactory volume for transmission, but up to the point where it gives satisfactory transmission it is used with economy.

Q. How far does it give satisfactory transmission?

A. The 24 gauge cable up to lines possibly a mile and a half to two miles long, and in the 22 gauge cable up to perhaps four miles. It all depends on the size of the exchange and the trunk line distances. The whole transmission question comes up in the design of the plant in order to give the most economical plan. That is, you want to give a certain grade of transmission. Now, the question comes, you can use some fine wire cable. Is it most economical to use that in the subscribers' lines themselves or in the trunks con- [fol. 8875] necting the offices in a multi-office city. That all has to be studied so that the plant can be laid out on the most economical basis.

Q. The ordinary practice contemplates about two miles between exchanges, does it not?

A. That may vary. You may have exchanges in large cities—in fact exchanges may be many miles apart. It may be two miles to the next exchange, but from an exchange on the border of the city to one on the opposite border may be many miles.

Q. The trunking would be limited to about two miles in that sort of an arrangement?

A. No, you have to have trunks that go from each office to every other office.

Q. To every other office? Yes, I see. But the subscribers lines in that sort of arrangement would be limited to about a mile and a half or two miles?

A. In some of the downtown offices they would. In the outlying offices they may run considerably more than that.

Q. In a city exchange that is properly planned it is possible to use a very large proportion of the fine wire cable?

A. In new work, yes.

Q. In new work?

A. Yes, sir.

Q. And it is being done?

A. Yes, sir.

Q. Very generally whenever a new plant or new wire is installed?

A. Yes, a large part of the cable output today is in 22 and 24 gauge wires.

Q. Does your calculation there show what percentage of the new work is done—I did not catch that—with this fine wire cable?

A. No, it does not, but I could get you that information. [fol. 8876] It is my recollection that somewhere in the order of the circuit mileage output for this year in cable of the Western Electric Company is estimated to be in 24 gauge wires.

Q. That is for 1924?

A. Yes, sir, for 1924.

Q. That is a forecast?

A. That is a forecast. It is merely an estimate.

Q. Have you a similar figure for the 22 gauge cable?

A. No, except I can say from my knowledge of the whole situation that the 22 and 24 gauge is the great bulk of the cable output.

Q. And the 19 gauge is used only where the other two will not fit?

A. Yes, sir, that is right. It is used when needed.

Q. Very much as open wire is used, where it is available——

A. Yes.

Q. It is just a matter of adaptation to the immediate circumstances?

A. Yes, I think I can agree with that, according to the most economical engineering design of the plant.

Q. How, has there been an increase in cost of wire in the past ten years?

A. Now, just what do you mean by wire?

Q. In general, wire for circuit purposes.

A. Well, that varies with the cost of copper.

Q. Yes, that is determined altogether by the cost of copper, is it not, pretty near altogether?

A. Plus the cost of drawing.

Q. But the cost of the copper is the largest element?

A. The cost of the copper is the largest element in the [fol. 8877] cost of wire.

Q. Have you the information to tell us what the difference is in the cost of copper between 1914 and the present time?

A. No, I have not.

Q. Well now, I did not quite catch how you figured the saving in the duct?

A. Well, broadly speaking I figured it this way. I had a figure for the circuit miles in cable of the type I was considering. Then I had the average size of the cable, which was 470 pairs, that is, a mile of that cable would contain 940 circuit miles. So in order to get the length of the cable I divided my total circuit mileage by 940, which gave me the miles of cable, the linear miles of cable that was saved, and then I figured the duct saving corresponding to the linear mileage of cable.

Q. As a matter of fact that saving would not be realized unless you reconstructed the duct lines so as to have just half the duct capacity you had before——

A. No, it is realized in this way. It is constantly postponing the time when, if you did not have those cables containing more wires it would be necessary to build more ducts. You see putting more wires within a given cable sheath increases the capacity of our conduit systems and postpones the time when reinforcement is necessary and when new runs of cable are laid it enables fewer ducts to be placed than would otherwise be necessary.

Q. It increases the effective margin of duct space in an existing plant also, does it not?

A. That is right.

Q. Well now, Mr. Rhodes, the first cables, I think, as [fol. 8878] you stated in your direct examination were installed in an experimental way in 1882. That was the beginning of the cable experiments, was it?

A. Why that is about as early as I have any information, yes.

Q. Now, when you say they were commenced in 1882 you mean that that is when the A. T. & T. Company or the American Bell Company, as it was at that time, commenced its experiments?

A. Yes, sir.

Q. And that is the first you know of by anybody?

A. Why there may have been some bunches of wire used that might be called a cable before that time. I have in my office some historical information that would enable me to answer that a little more precisely. But whether or not some company did take a bunch of wires and wind a tape around it and make what might be called a cable before that time, I could not say offhand now.

Q. The first conduit system was in 1883 in Boston, as I understand it?

A. Yes.

Q. That was by your company?

A. I might say now my recollection is that there were cables before 1882. I think I can state pretty positively that there were cables before that time.

Q. By whom?

A. By the licensees of the American Company, that is, there were cables that were used in New York across the Brooklyn Bridge, which I am quite sure antedated 1882.

Q. Yes.

A. But it was a very small use. I did not mention the date of 1882 with the idea of stating that that was an in- [fol. 8879] vention of cable at that time, but at that time the General Staff of the American Company did undertake a careful study of the transmission properties of cables.

Q. Then when was it that you first used the 50 wires in a pipe insulated with cotton, according to what you call the Brooks system, the pipe being filled with oil? On page 238 of your testimony I think you referred to that.

A. I would like to make a note of that question and get

the information accurately for you. I have it on record, but I haven't it here. It was used in the very early days.

Q. What is the significance of the term, "The Brooks system?" Who is Brooks? What did he have to do with it?

A. The Brooks system was a system whereby the wires were pulled into a pipe and the pipe filled with oil. Oil was used as the insulating medium in the Brooks system.

Q. Who was Brooks?

A. Why other than the fact that he was the man that invented that system I couldn't tell you right off. He was not on the General Staff of the American Company.

Q. Then the next development was the use of dry cotton as an insul-ting medium?

A. Yes.

Q. Then in 1880 you got a dry paper. I think you explained that that use of dry paper was really an accidental discovery, was it not?

A. If I remember it was, yes.

Q. Whose discovery was it?

A. That was done over in the plant in Long Island, and I think I stated in answer to a question from Mr. Burr that it was done under the direction of Mr. John A. Barrett.

[fol. 8880] Q. I think you stated that Mr. John A. Barrett conducted some experiments in the development of that idea?

A. Yes, sir.

Q. But this was, I understood it, following the accidental discovery of the possible use of that sort of medium?

A. I think that is right, yes.

Q. Now, what I want to get at is the circumstances connected with that accidental discovery of the use of the dry paper as a possible medium upon which Mr. Barrett conducted his investigation or his experiment?

A. If I get your question, what happened was this. He was experimenting with this paper and I think he got on the track of that from a kind of wire that was used by milliners for making hats, and that wire was wrapped with paper, and he sought to use wire that was wrapped in that way in cable. But they did not trust a dry paper, so they used an insulating compound and tried to impregnate the core of the cable with this insulating compound. And in the course of that work they ran some of the cable through

pretty rapidly and they found its electrical properties were better than any cable they had had before, and they examined the cable carefully, and they found they had run it through so rapidly that the insulation compound had not thoroughly impregnated the core of the cable; it had not got below the surface, so they had in the interior of the cable dry paper without the filling compound.

Q. Where did they get the idea of using this milliner's wire?

A. As far as I know as I understand it Mr. Barrett had the suggestion.

Q. Mr. Barrett was working at that time for the New [fol. 8881] York and New Jersey Company?

A. I think so.

Q. Is it the corporate name of one of the associate companies?

A. It was at that time, yes.

Q. It was at that time; that company, however, is not in existence?

A. No.

Q. There has been some sort of a reorganization which covers that field with another company or two other companies perhaps?

A. It is the New York Telephone Company now that operates in that territory.

Q. Up to that time the investigation of the General Staff of the American Company in the development of cable had not accomplished very much in the way of successful development, had it?

A. Why yes, I should say it had.

Q. Were you using cable commercially before the use of dry paper?

A. Oh yes.

Q. To a very large extent?

A. To a large extent for that period, yes. Of course, the business was small at that time.

Q. But you used it, that is, the cable that was insulated by the use of dry cotton—was there an insulating compound used in connection with the cotton or was it simply the cotton itself?

A. There was an insulating compound first, and it was omitted then.

Q. And dry cotton used?

A. Yes, sir, and dry cotton used.

Q. And that was used commercially wherever cable was considered proper to be used?

A. Yes.

Q. How large a cable did you get with the dry cotton insulation? I mean how many pairs?

[fol. 8882] A. Why it is my recollection that that was used up to about 50 pairs.

Q. Who developed the multiple switchboard? Who was the pioneer in the multiple switchboard?

A. Well, the Western Electric Company engineers were very much involved in the development of it. As I understand the situation, the idea of the multiple switchboard originated in the mind of a man named Firman.

Q. Who was he?

A. He was at that time connected with the Edison Exchange in Chicago. He was shortly subsequent to that time in the employ of the Western Electric Company, and I think at that time when he was in the employ of the Western Electric Company the multiple switchboard patent was issued to him.

Q. Was that the first patent obtained on a multiple switchboard?

A. As far as I know.

Q. When was that, Mr. Rhodes?

A. Why it was somewhere around 1880 to 18—around 1880. It may have been a year or two subsequent to that time or might have been a year before. My recollection is not accurate as to that.

Q. Did his patent develop a multiple switchboard that was commercially used?

A. Yes, I think it was commercially used in Chicago.

Q. From that time?

A. From that time, and the subsequent development the engineers of the Western Electric Company were largely interested in and they had the co-operation of the engineers of the General Staff.

Q. What did Sabin and Hampton have to do with it?

A. They, as I understand it, got up a non-multiple type [fol. 8883] of board, so-called express system, which was used out in California.

Q. Do you know of the name of Joe Connell, in the development of the switchboard?

A. O'Connell?

Q. Connell?

A. I think it was O'Connell.

Q. I don't know. It may be.

A. He was with the Chicago Telephone.

Q. Yes.

A. That is the man. It is O'Connell.

Q. What did he have to do with the development of the multiple switchboard?

A. Why, I believe O'Connell suggested the use of lamp signals.

Q. When was that?

A. I am sure I don't remember.

Q. Are you familiar with the Milo G. Kellogg patents in multiple switchboards?

A. No, sir.

Q. There was a Milo G. Kellogg patent on switchboards, was there not?

A. I couldn't say. I am not familiar with it.

Q. You have never heard of it?

A. I know there was such a man who was concerned with the telephone business, but as to just what he invented I couldn't tell you.

Q. Now, did the General Staff do any work in the development of the multiple switchboard idea?

A. I think so.

Q. What is the switchboard that is in common use; what is that known as; what is the name of that in the trade?

A. You mean that is in common use today?

Q. Yes.

A. Why the type that is in most common use is the common battery multiple board.

Q. Yes. Who would you say is responsible for the de- [fol. 8884] velopment of that board in its present form?

A. Why, that was to the best of my knowledge and belief wholly a Bell system development in which the Staff engineers and the engineers of the Western Electric Company were both concerned.

Q. What would you say as to the importance of Mr. Scribner's personal contribution to the development of the present switchboard?

A. They were pretty large.

Q. Isn't it a fact that the basic principles as developed

by these other men that you have mentioned were gathered together by him and finally put in the form which is now used?

A. I think that that is true in a way. There was original work done by Mr. Carty the present head of our Department of Development and Research on the fundamental common battery switchboard. There was another type that was developed by my former Chief, Mr. Hammond V. Hays. There was another form developed by Mr. John S. Stone, a member of the Technical Department of the General Staff at the time I came into the business, and I remember personally that about 1893 or '94 I made transmission tests in the evenings on what, I believe, was the first common battery switchboards, little boards that were installed in the neighborhood of Boston. One was at Lexington, another at Wellesley, another one at Winthrop. And I remember going around to subscribers' premises in the evening and calling up another man from our department who made tests to see how well those circuits would talk. There was a great deal of development work and improvements due to Mr. Scribner, which crystallized afterwards in switchboards that were installed at Worcester, and at Louisville, Kentucky.

[fol. 8885] Q. And Mr. Scribner, who is he?

A. Mr. Scribner has been a very prolific inventor, who was with the Western Electric Company from the early days of the business, and progressed through their organization to become their Chief Engineer, and five or six years ago he retired.

And thereupon a recess was had until 1:30 o'clock P. M. of same day (Tuesday, April 22nd, 1924).

[fol. 8886] Tuesday Afternoon

April 22nd, 1924.

And also FREDERICK L. RHODES, resuming the stand for further cross-examination, continued his testimony as follows:

Cross-examined by Mr. McConnaughey:

Q. Mr. Rhodes, on page 309 of your testimony, direct examination, you were discussing work done by the Gen-

eral Staff on the subject of the development of switchboards, and you stated that one important step was the development of the common battery system. Explain what you mean by that—the common battery system?

A. That is a method of operation whereby the magneto generator for calling and the local battery for supplying the subscriber's transmitter with its operating current were replaced by a common battery placed at the central office. That enabled the current supply for the subscriber's transmitter to be fed out of the central office over his line, and it overcame the necessity for the magneto generator at his station and was used for signalling the operator and also signalling for disconnect when the conversation was completed.

Q. Was that common battery idea completely developed, originated and developed, by the General Staff?

A. In connection with the Western Electric Company, as a piece of co-operative work, as far as I know, yes.

[fol. 8887] Q. Who by name were particularly instrumental in developing that idea?

A. J. J. Carty, Hammond V. Hays, John Stone, Theodore Spencer——

Q. Theodore who?

A. Theodore Spencer.

Q. Which organization was he connected with?

A. The General Staff of the American Company. And C. E. Scribner in the Western Electric Company.

Q. What period of time did that development cover?

A. I should say from memory along from 1892 to 1898, the early stage of the development, and, of course, the idea has been in more or less continuous development from that time to the present.

Q. You also say on the same page that about 15 years or fully 15 years ago the question of the development of the so-called automatic switchboard was taken up. Now, has your organization been working on that proposition continuously since that time?

A. I should say so, yes.

Q. What is the Stroger system?

A. It is one form of automatic system, in which the selection is made by a rotating arm, which is raised to a certain level of a bank of contacts, and then is rotated hori-

zontally until the desired contact in that particular level is obtained.

Q. By whom was that system developed?

A. As far as I know that is invented by Mr. Stoger, and it was developed by him with the assistance of some other people, one of whom was a man named Keith, of the organization of the Automatic Electric Company, and within recent years they have been making this apparatus to our specifications which have included improvements in [fol. 8888] the apparatus and have included means whereby that type of apparatus can be used in the same exchange where there are manually operated offices.

Q. And it is this particular apparatus that you get the right to use by your arrangement that you testified to this morning with the Automatic Electric Company, is it?

A. I do not know that we get the right to use it in that way, because the associated companies are purchasing apparatus of that type from the automatic company. There were various patent questions involved, and the arrangement that I have described this morning served to allow the Automatic Electric Company to proceed under certain of our patents and certain of their patents became available for the use of the Bell system.

Q. Certain of their patents concerning automatic switchboards?

A. Yes.

Q. So that that arrangement that you testified to this morning was effected for the purpose of giving you the right to use these automatic switchboards, was it?

A. It was the right to use patents which that organization held, not to use that particular type of switchboard, but to use their patents wherever there is a conflict between their patents and the patents we hold.

Q. It was then in adjustment of some patent questions between the two companies, was it?

A. I so understand it, yes.

Q. When was that arrangement effected, do you know?

A. No, but I should say it must have been eight or nine [fol. 8889] years ago.

Q. To what extent is the Bell System using the Stroger system of automatic switchboards now?

A. I do not know that I can answer that as fully as you would like. I have some figures on that in the year 1921.

The schedule for the whole Bell system called for about 75,000 line equipment of the panel type. They are manufacturing this type of equipment, the Automatic Electric Company is manufacturing it for the Bell system in considerable quantities.

Q. That was in 1921?

A. Yes.

Q. Have you any data for 1922 on the same subject?

A. No.

Q. Or 1923?

A. No, that is all that I have. It is possible that another witness can give you that information more completely.

Q. What other witness would you suggest?

A. I don't know whether or not Mr. Allen, who was here before, is posted on that subject or not. He is more concerned with switchboards than I am.

Q. What are the advantages or disadvantages of manual switchboards in comparison with automatic switchboards?

A. I could not go into that, because that is out of my line. I am an outside plant man, and I am not sufficiently familiar with the details of the switchboard problem to go into it. It is a rather special question.

Q. Are you able to say in a general way which is the more economical in operation?

[fol. 8890] A. I think that depends on a great many local factors that have to be taken up in each specific case.

Q. What are the local factors?

A. As I say I would not feel that I could go into that, because it is out of my line.

Q. You disclaim any ability to discriminate between manual and automatic switchboards?

A. Yes, I have not been in that end of the work at all.

Q. Now, the panel type has been developed entirely by the A. T. & T. General Staff, has it?

A. In co-operation with the Western Electric Company, yes.

Q. Are there any of the panel type automatic exchanges in operation in the State of Ohio?

A. None as far as I know.

Q. Are there any of the Stroger system automatic exchanges in operation in the State of Ohio that you know of?

A. Why I think that there is one and there may be others. I don't know.

Q. Are you familiar with the semi-automatic system that is in use in some places?

A. I know there was an installation of that type that was put in for experimental purposes in Newark, New Jersey.

Q. When was that?

A. That our engineers followed for a great many years. Why, there again I can't tell you accurately, but I should say it was fully eight years ago.

Q. How long did that experiment last?

A. Oh, it lasted for a number of years, and then there were changed over subsequently to full automatic.

Q. Would you consider that experiment successful?

[fol. 8891] A. Yes, it served the purpose it was intended for.

Q. Why was the substitution made of full automatic?

A. Because it had been worked out to a point where it was felt that that would give satisfactory operation. The idea of putting that in on a semi-automatic basis was that the subscriber did not have the dial. He gave his call to the operator, but from that point on, handled it on an automatic basis. And it was used to obtain a vast amount of data as to the operation of the equipment.

Q. On page 311 of your direct examination you gave some information concerning the use of platinum in contacts?

A. Yes.

Q. And you traced the development or experiment of a substitute for platinum in those contacts through successive stages, first reducing the amount of platinum by one-half by a different method of application as I understand?

A. That is right, spot welding instead of riveting.

Q. Instead of what?

A. Instead of riveting; spot welding.

Q. Yes. You quoted a price, a pre-War price of 20 to 25 dollars per ounce for the platinum, increased by War conditions to $100.00 per ounce?

A. Yes.

Q. And you effected an economy of 50 per cent by that development, that is, by using less of the platinum?

A. Yes.

Q. You then pointed out the next step, substituting palladium for the platinum?

A. Yes.

Q. And reducing the cost fifty per cent again?

A. Yes.

Q. Now, that was fifty per cent of the previous fifty [fol. 8892] per cent I assume.

A. Yes. It did not mean that we got it for nothing.

Q. And that reduced the cost of material for that particular function to $25.00 then, I mean $25.00 per ounce, or the equivalent of an ounce of platinum?

A. It would have the equivalent of that if we had used platinum, that is, if the first cost was a hundred, the first reduction brought it to fifty and the next one to twenty-five and the next one to $12.50 on that scale.

Q. Then after the use of the palladium you substituted an alloy for the palladium?

A. Yes, sir.

Q. Effected another fifty per cent reduction?

A. Yes.

Q. That brought you down to $12.50?

A. To the basis of one-eighth of the riveted platinum.

Q. So that the final result of those experiments was to reduce the cost at least $7.50 below pre-War cost of the platinum?

A. Yes, using that as a standard of comparison.

Q. Now, you stated that there was also a total saving of from two to three million dollars in the contact metal?

A. Yes.

Q. On the system; just how did you work out that saving; what was your standard of comparison?

A. I will be glad to show you that. I would like to make all these things as clear as possible. It is not a mysterious thing. It is simple, except technical in a way. Well, I started in with data covering the years 1916 to 1921 inclusive, six different years, having data as to the cubic inches of these contact metals that were purchased in each of these years. Now, I can give you that amount if [fol. 8893] you like.

Q. Go ahead.

A. We have not, as you see, entirely eliminated the use of platinum, because there are some cases where it is still

necessary to use it. Here are the cubic inches of platinum used, beginning with the year 1916 and running to the year 1921: 192, 293, 215, 31, 119, 138.

Now, I will give you the cubic inches of palladium for those same years, beginning with 1916: 258, 514, 107, 97, 228, 375.

Now, I will give the cubic inches of the special alloy: 98, 433, 1025, 266, 1,331, 3,521.

Now, I have the average price per cubic inch of each one of these, beginning with platinum for the year 1916: 959, 1,182, 1253, 1219, 1316, 898.

And the corresponding figures for palladium: 549, 625, 802, 794, 628.

Q. These are dollars that you are talking about?

A. Dollars, dollars per cubic inch. 628 was the last figure, and 371.

Now, for the special alloy: 169, 185, 183, 180, 177, 157.

Now, the special alloy weighs 8.16 ounces per cubic inch. The palladium weighs 6.01. The palladium weighs 6.01 ounces per cubic inch. The platinum weighs 11.35 per inch.

Now, as I have said during each of the above years, certain amounts of special alloy, palladium, platinum, were purchased, and if anyone of these improvements had not been made, it would have been necessary to purchase each year an amount of platinum equal to twice the combined [fol. 8894] amount of special alloy and palladium and platinum that was actually purchased. Now, the savings I have computed for each year on the basis of taking the number of cubic inches and multiplying by the price and comparing with what it would have been if the material had been platinum instead of material which was used. Now, would you like me to——

Q. Yes, give the total?

A. Well, the total saving in first cost was $708,000 for the year 1916; $2,183,000 for 1917; $2,833,000 for 1918; $798,000 for 1919; $3,881,000 for 1920; and $6,429,000 for the year 1921. That makes a total saving for those years of $16,833,000. Now, I have taken for the figure which I have used .8 of that total figure, to allow for certain amounts of this apparatus employing this material which the Western Electric Company manufactured for sale outside of the Bell system, that is, of this total saving made in apparatus, at least 80 per cent of it was realized in the Bell system; applying

that 80 per cent gives me $13,466,000 for the total during that period of six years.

Q. Your statement in your direct examination was that you effected a saving of between two and three million dollars?

A. For each year.

Q. You did not say that. And that comes down to the end of 1921?

A. Yes.

Q. Now, those contacts that are affected by that saving are an essential part of switchboard construction?

A. Yes.

Q. On page 323 of the record, direct examination, you [fol. 8895] mention a saving of $80,000,000, which you attribute to the use of phantom circuits?

A. Yes.

Q. Now, I understand that the saving in the way of phantom circuits is the saving of one circuit out of three; is that correct?

A. Yes, four wires will handle three conversations instead of two.

Q. Yes.

A. That is right.

Q. Does that measure the saving?

A. That saving in the wire and in the pole line construction which carries the wires, less the cost of the phantom coils that are required and the transpositions that are required to make a phantom effective. That was taken into account in my computation of the saving.

Q. Then when you come to the subject of quadded cable, which is connected with the phantom circuit, as I understand your explanation, you mean a saving of $10,000,000 by the use of quadded cable?

A. Yes.

Q. Is that to be added to the eighty million?

A. Yes. It is a different thing.

Q. It is a different thing?

A. Yes, it is not comprehended in the eighty million.

Q. It is the application of the same principle?

A. Yes, sir.

Q. I understand that the quadded cable you say enables you to carry the phantom principle into the cable?

A. That is right.

Q. Without the addition of additional wires?

A. That is right. That is, before we had the quadded [fol. 8896] cable for each group of four wires in the open wire portion of the plant, which carried three messages, it was necessary to have six wires in extending that into the cable.

Q. But by the quadded cable idea you carry the phantom principle into the cable?

A. That is right.

Q. That, however, is not applicable to ordinary cable construction in local exchanges, because of the cost of the terminal apparatus, as I understand it?

A. Not so much that. I think the cost of terminal apparatus I spoke about in connection with the carrier system, but its principal use is for bringing toll lines in. It is not used in subscribers' lines; and it may some day be used to a certain extent in trunk circuits connecting exchanges, but as it stands today its principal and almost sole use is for bringing toll lines into cities.

Q. What is a repeater?

A. Well, a repeater or an amplifier is a device whereby the telephone current is weakened, and after passage over a long line is made to control a new source of energy, bringing fresh energy into the conversation and stepping it up, so to speak, and sending it out over another stretch of line in the same wave form that it came in, but revivified, if I may use the term, strengthened, so that it can go on for practically an indefinite distance.

Q. And it can be revivified at intervals along the line?

A. Yes.

Q. What is the principle upon which that device works?

A. It employs, with a large amount of auxiliary appa- [fol. 8897] ratus a vacuum tube, in which the outgoing current passes from the filament of the tube to a plate, and the incoming current is impressed upon the grid, so that, practically as a valve operates this potential of the grid controls the strength of the stream of electrons flowing through the grid from the filament to the plate.

Q. Whose idea was that originally?

A. The vacuum tube idea originally was the invention of Deforest for wireless telegraphy. In that form it was not applicable to a telephone repeater, but our Staff engineers saw the possibility of using that principle, and we procured the rights for telephonic communication from Mr.

Deforest, and then proceeded on a very comprehensive scheme of development, whereby it was made available to operate as a telephone repeater. We had a repeater before that time, which was what was termed a mechanical repeater.

Q. Yes.

A. It was operative but troublesome.

Q. This was an improvement on it?

A. Oh yes.

Q. Operated on an entirely different principle?

A. Yes, sir.

Q. Rather than an improvement on the mechanical.

A. It was on the same principle, in that it supplied new energy to the attenuated telephone conversation at that point, but it operated by having the elements of a receiver and transmitter connected together, so that the incoming current acting on the receiver portion of the element controlled the transmitter and brought in new energy in that way. Its limitation was that it had what is termed mechan- [fol. 8898] ical inertia, that is, it had mass, and it was difficult to make this flow of rapid telephone undulations, thereby taking the stream of electrons, which was devoid of mechanical inertia, and thereby we effected a better arrangement.

Q. Back of Deforest there was the development of the tube idea, was there not?

A. There were tubes that were used for other purposes. There was one invented by an English scientist named Crooks.

Q. Edison did something?

A. I don't recall that.

Q. And Fleming?

A. I think Fleming did something on it. But they did not have telephone repeaters.

Q. I understand; what the General Staff did was to take the ideas that had been developed by Crooks originally, possibly Edison and Fleming and Deforest, and bring it into its present form; is that it?

A. The Deforest idea is the only one that was used to any appreciable extent, and there we took something upon a telephone repeater and by devising circuits and auxiliary apparatus and improving the design and construction of the vacuum tube, we made an operative telephone repeater

which had not existed in the form of a vacuum tube before that time.

A. You used a figure at page 377 of your direct examination of $4.90 as the market price of the transmitter, receiver and induction coil; that, I understand, is the price at which the Western Electric Company sells those devices to the general trade; is that correct?

A. That is right.

Q. At what price do they sell those instruments to the A. T. & T. Company or the associated companies—the A. T. [fol. 8899] & T. Company?

A. Yes, they do not sell them to the associated companies but they manufacture those instruments for the American Company. Their figure to us includes nothing for patents and nothing for sales expense or for advertising, and nothing for development. Lacking those factors the total price to the American Company is $3.42.

Q. How is that divided among the three items?

A. Do you want them both on the general trade, and the American Company?

Q. Yes.

A. The price of the transmitter to the general trade, which is known as the No. 323 BW transmitter is $2.00; the price of the 323, which is a similar instrument, to the American Company is $1.48. The price of the 144 AW receiver to the general trade is $2.05. The 144 receiver to the American Company is $1.37. The No. 46 induction coil to the general trade is 85 cents and to the American Company 57 cents. I think I was asked about that at the end of my direct examination before and those figures are already in the record.

Q. I did not find them. There was a lot of miscellaneous chatter at the end and I may have overlooked it?

A. Yes.

Q. The price you have given to the A. T. & T. is the net price that they actually paid, is it?

A. I understand so, yes.

Q. You gave a figure of depreciation of seven per cent in your estimate of the cost of this service. What length of life does that seven per cent depreciation figure contemplate?

A. I think that is already in, too, and as I remember it, and I should say the same thing now, about eleven or

[fol. 8900] twelve years, with a salvage of fifteen or twenty per cent.

A. Yes.

Q. Fifteen or twenty per cent?

A. Yes.

Q. What is the life of the induction coil?

A. Why I have taken this as an over-all figure for all of the instruments. It does not, of course, mean that that is the physical life due to wear and tear alone, but it takes into account very largely changes and improvements that are made as the result of our development work, whereby new and improved types come along and gradually sweep out of existence the previous types.

Q. The fact is that the induction coil is practically indestructible, is it not, so far as physical——

A. So far as physical life goes. The terminals may break off, but if there were no change in type by and large they would last for a very long time.

Q. How about the receiver and transmitter?

A. Why the same is true, but I should say to a less extent, because they are more liable to be broken and injured when desk stands are knocked over, but the actual wear and tear life would be very much longer than the figure I have given.

Q. Yes.

A. That is due to the change in style as the instruments are improved.

Q. It is not the practice, is it, when the style is changed to take out the old ones and put in new ones?

A. Not at once, but it begins and runs over a term of years. The rapidity with which that is done is wholly in the hands of the associated companies. They are free to return their old instruments and get a new type without additional charge.

[fol. 8901] Q. At any time they see fit to do it?

A. Yes, sir.

Q. Have there been any radical improvements in the last five years that would make it advisable for an associated company to retire all of its transmitters and receivers and take up new ones?

A. No, not to retire them all. There has been an improved type of transmitter, as I said, the 337, which is enough better than its predecessor to make its use advantageous on long lines, but not enough to require an extensive substitution.

Q. And extensive substitutions of transmitters, receivers and induction coils have not been common in the history of the Bell companies, have they?

A. I should say they have, yes. As the types have changed there have been general substitutions, very general substitutions. The old single pole instrument has gone entirely out of existence. A large proportion of the 122 type of receivers has.

Q. How long ago did the old single pole go out?

A. I don't know when the last ones came in.

Q. How long ago was this general substitution that you speak of?

A. Those instruments began to go out of service when the 122 type of receiver began to come in.

Q. Was the 122 the first bi-polar type that you put out?

A. No, there were bi-polar types that were put out in small quantities, at least as far back as 1894, but they began to go out extensively about 1900 to 1902. Now, the same thing has gone on in the case of transmitters. The earliest form of the solid back wall set, the 239 type, was swept out [fol. 8902] of existence fairly rapidly as the type that is used on desk stands, began to come in, and that type has changed.

Q. On page 343 you refer to carrier current telephony. Just what is that?

A. That is a method for carrying four additional conversations over a pair of wires in addition to the one which it normally carried. It is a very highly involved proposition. Each telephone current is combined with a high frequency current of a different periodicity. For instance, one is combined with a 15,000 per second high frequency current, another with a twenty another with a twenty-five and another with a thirty.

Q. You mean 15,000?

A. 15,000 alterations per second, and those are transmitted simultaneously over the line and then filtered out, according to the carrier frequency, of fifteen, twenty, twenty-five or thirty thousand frequency. And this high frequency carrier current is removed, and it having been diverted into a special channel, can be used as a talking channel independent of the others. It is a means for increasing the number of conversations that can be carried on over a given amount of wire.

Q. Is that principle in common use?

A. Not in common use. No, it is increasing.

Q. Is it in use on the Long Lines or the local exchanges?

A. It is used on the Long Lines and to some extent, and an increasing extent, in the toll line plants of some of the associated companies. The New England Company is using it on its own toll lines and the Pacific Company is using it on [fol. 8903] toll line.

Q. It is a toll line proposition?

A. It is, yes.

Q. Is it in use in Ohio?

A. I don't know. I don't think it is.

Q. What did General Squire have to do with the development of that idea?

A. He had something to do with it. The amount he had to do with it will be determined shortly, because it is a matter that is in litigation now.

Q. Between General Squire——

A. And the American Company.

Q. And the A. T. & T. Company?

A. Yes.

Q. General Squiare dedicated his invention to the public, did he not?

A. Why, I think he did at one time, and then I think there was some drawback on that as I understand it.

Q. Is he contesting the patent rights?

A. I believe he is.

Q. With the A. T. & T. Company?

A. I believe he is, yes.

Q. He is contesting the patent rights?

A. I believe he is.

Q. With the A. T. & T. Company?

A. I believe he is, yes.

Q. What litigation has there been or is there now pending concerning telephone patents?

A. Generally?

Q. Yes.

A. I couldn't tell you. That is out of my line. I happen to know about this particular case.

Q. Do you know that there is or is not a considerable amount of it going on at this time?

[fol. 8904] A. My impression is that there is not very much. There has been a certain amount, a small amount, I think, in the radio field, but nothing very much.

Q. What is a spiral coil, spiral loading, I will put it?

A. I don't know that I just exactly get that. There is a form of loading, continuous loading, which is made by winding a small iron wire around a copper wire in a continuous spiral. Possibly that is what you have in mind.

Q. I think that is what I have in mind, yes.

What is that used for?

A. It is used principally in submarine cables.

Q. It is used on the Havana cable you have testified about?

A. Yes, sir.

Q. On the Catalina Island cable, also?

A. I don't remember whether it is in the Catalina cable or not, but it is in the Havana cable.

Q. Who invented that?

A. Why I don't know. That was known in the art for a good many years.

Q. It is not an A. T. & T. invention, is it?

A. No.

Q. The A. T. & T. staff, General Staff, has done some work, has it not, on the application of the multiple principle to telegraph wires?

A. Yes, this carrier current proposition that you asked me about just now is applicable to telegraph use of the wires, and we make use of simultaneous telegraphy and telephony on many of the Long Lines circuits.

Q. The A. T. & T. Company owned or controlled the Western Union Telegraph Company for a number of years, did it [fol. 8905] not?

A. They had at one time a large interest in it. I don't know that it was a controlling interest, but it had a large interest.

Q. And they undertook to apply that principle to the telegraph lines, did they not?

A. You mean carrying on simultaneous telegraphy and telephony?

Q. Yes.

A. Not as far as I know. There was an interchange of wires at times of emergency between the plants. That went on.

Q. How was that interchange effected? Were the telegraph wires used for telephone purposes?

A. And the telephone wires for telegraph purposes, in the event of sleet storms which destroyed the plant of one company. It was an attempt to maintain a service for the public.

Q. But there was no general effort made to use the telegraph wires for telephone purposes?

A. Not as far as I know. It never came to my attention. I don't know how far that might have gone.

Q. Isn't it a fact that the A. T. & T. Company announced repeatedly in annual reports and elsewhere in its publications and public announcements their purpose to utilize telegraph wires on a large scale for telephone purposes?

A. I think that was the proposition, but there were a great many practical difficulties in the work and it worked out that it did not go very far.

Q. Were there extensive experiments in that direction, seeking to bring that about?

A. There was some work done on that, yes.

[fol. 8906] Q. How much work was done along that line?

A. I could not say.

Q. Did you have anything to do with that experimentation?

A. No.

Q. The receivers and transmitters that are now in use on the Bell system, have you in mind any changes that are likely to be made that will bring about any general substitution of new forms of receivers and transmitters?

A. Well, there is a very active experimentation which has been going on for the last three years and is going on now, seeking to obtain still better forms of instruments. As to when that will come about, it is impossible to say, but I believe that there will be changes in the future, yes.

Q. What is the line of the experimentation? What is it that is sought to be brought about?

A. Better quality of transmission, closer reproduction to the character of the human voice, and also increased volume, which will admit of still further economy in the plants of the associated companies by the more extended use of fine wire cable.

Q. Greater carrying power.

A. Yes.

Mr. McConnaughey: I haven't any more questions to ask. I do not know whether my colleagues have or not.

Commissioner Poor: Have individual counsel any questions they would like to ask.

Mr. Shuler: It may be necessary for me to bring down the record of the case you testified in befo[illegible] unless you take my word for it that it is in the record.

[fol. 8907] Cross-examination.

By Mr. Shuler:

Q. Mr. Rhodes, I just want to ask a couple of questions, one especially on your saving on the instrument sets. You took eight per cent depreciation, did you not?

A. Seven.

Q. Seven? That is figured on the cost of the original, the original cost of the instrument?

A. It is figured on a base of the figures that I submitted, $4.50.

Q. Which is supposed to be the original cost?

A. Which is a conservative figure of the first cost of the set.

Q. And your understanding is that depreciation has to be based on the original cost?

A. I did in that particular case. If I had based it on anything else I would have taken a different rate.

Q. Now, if that original cost or book cost was $2.25 instead of $4.50, of course, your result would be just one half of the amount you found; is that right?

A. If I figured on a $2.20 instead of——

Q. $2.25?

A. $2.25 instead of $4.50, and applied seven per cent to both figures——

Q. And all your other percentages the same, you would get just one half?

A. In those that I figured as percentage, it would have been, yes, that is, the return would have been on the——

Q. Well, wait. Let me put it this way. Take an instrument, the book cost of which is $2.25, what is the annual cost to the company?

A. That is a different problem from the one I worked on. [fol. 8908] You see what I had in mind was this——

Q. Just a minute. Just answer my questions. I want you to do this.

In your direct examination you took an instrument which cost $4.50, and to that you applied certain percentages of depreciation, interest, taxes, repairs and so forth?

A. My repair item was not a percentage.

Q. All right. Now, I want you to apply the same figures to an instrument that cost $2.25.

A. If I applied the same percentages to those items, if the

same percentage was applied, it would result in half the sum.

Q. Correct.

A. Obviously.

Q. Is there any reason why you would apply different percentages or different figures simply because the book cost in the one case was $4.50 and in the other case was $2.25?

A. I was not dealing with book costs. I was making an estimate of what it would cost——

Q. Please answer my question.

A. I can't, because you are setting up a condition different from what I figured, and then you are asking me to do something to that. I was not taking the book cost.

Q. Let me ask you this question, Mr. Rhodes; what is the difference between book cost and original cost?

A. I don't know.

Q. Then how does it make any difference whether you do take book cost or original cost?

A. Because what I was undertaking to do was to make an estimate of what it would cost this company to provide an instrument service if it did not get its instruments in the [fol. 8909] way it gets them now. So I was not dealing with a book cost. I was dealing with what it would cost them to buy instruments today to replace the instruments they have got.

Q. You took the original cost?

A. If you are pleased to call it that; it is what it would cost them to get the instruments today.

Q. Very well.

A. I wanted to show that we were talking about the same thing.

Q. I do not attempt to do anything tricky.

A. I did not think that, but I wanted to show we were talking about the same thing.

Q. If you take a cost of $2.25 instead of $4.50, your result is one half of 99 plus, which, as I recall, was your result.

A. Subject to a number of differences along the way. One of them was in the item of repairs, which was not a percentage in my estimate.

Q. Can't you figure it out in a moment on the basis of $2.25?

A. Subject to the difference in the item of repairs and subject to the fact that I would probably in that case take a

different figure for my cost of administration and perhaps for my reserve for contingencies and subject to the fact that there is a ratio of the number of instruments to the number of stations, and that there is another item for the carrying of the stock of instruments, that would be true.

Q. Now, wait, Mr. Rhodes. I am only asking you what I think is a fair question.

A. Yes.

[fol. 8910] Q. I want you to answer my question, considering every element that you considered when you answered Mr. Burr's question, and that is all. If you considered all of those elements that you have mentioned and intend to mention when you answered Mr. Burr's question, I want you to consider all of those items when you consider my question.

A. Then I would have to take a little time to think it over, because some of these figures would be on a different basis, and I would have to think them over.

Q. Would you be willing to make an approximation, not for the purpose of accuracy, but an approximation that would be sufficient for our purposes here?

A. I would be willing to make an approximation.

Mr. Burr: With the understanding, of course, that an approximation is only an approximation.

Mr. Shuler: Certainly, but I want it to be within 125 per cent correct.

The Witness: Now, I want to fairly answer your question.

Q. Yes, and I want to be perfectly fair with you.

A. Surely. And I should say on that basis that it would run a little under 60 cents.

Q. A little under 60 cents?

A. Yes, sir.

Q. But not more than 60 cents?

A. I should not suppose it would. Those are comparable estimates based on those different first costs you have given.

Q. Now, Mr. Rhodes, you recognize this.

[fol. 8911] A. That looks familiar to me.

Mr. Shuler: I am showing Mr. Rhodes the annual report of the Directors to the stockholders of the American Telephone & Telegraph Company for the year ending December 31, 1923, and on page 28 of that report you find that the Bell owned telephone stations were 10,406,155.

Q. Is that correct, Mr. Rhodes?

A. I presume it is, sir, if it is in the annual report.

Q. I did not ask you that. I asked you if I read correctly from the annual report?

A. You did.

Q. Now, I show you page 42 of the aforementioned report, and I ask you if that report does not show among the assets of the company as of December 31, 1923, telephones, $33,275,285; is that correct?

A. Except you have left off 85 cents.

Q. All right. Now, Mr. Rhodes, if you divide the number of telephones into that book value, as set up in that report, you have a per telephone value of $2.44, do you not?

A. I don't know. I haven't done it.

Q. Will you do it, please?

A. You mean divide the number of stations into it, not the number of instruments but the number of stations?

Q. The two figures I have read.

A. That one was the number of stations, not number of instruments.

Q. Every station the evidence has been is an instrument. $2.24, isn't it?

A. What do you say the answer to that sum was?

[fol. 8912] Q. $2.24?

A. I make it $3.20.

Q. Maybe my figures are wrong.

A. It is certainly over three. 10,400,000 into 33,275,000 must be over three.

Q. You must be right. Now, Mr. Rhodes, do you know whether or not of your own knowledge as telephones are moved or as telephone sets are sent out by the A. T. & T., if the price increases, they are put on the books at the increased price and not the original cost price.

Mr. Burr: Put on whose books?

Mr. Shuler: The A. T. & T.

The Witness: No, I do not know how they are put on the books.

Q. You don't know that?

A. No.

Q. Now, Mr. Rhodes, you testified before the Public Utilities Commission of Ohio in 1920, didn't you? Have you got the record page of your testimony?

A. Before the Ohio Public Utilities Commission in 1920? That is this Commission?

Q. Yes.

A. Yes, I did.

Q. Have you got page 483?

A. No, I have not got that record.

Q. Do you remember whether or not you testified at that time that the General Staff was very active in relation to switchboards and that Cleveland was sure to benefit very greatly thereby?

Mr. Burr: I think the record is the best evidence.

A. I don't remember it, no.

Mr. Burr: I do not want to put you to any unnecessary [fol. 8913] trouble, but we would like to have it.

The Witness: Understand I am not disputing the facts. I might have said that, and I do not see anything now that would be wrong about it.

Mr. Shuler: I might be wrong just as I was with the amount.

Q. Mr. Rhodes, I will ask you if, before the Public Utilities Commission of Ohio, January 14th, 1920, you were not asked this question: "I understood you to say, Mr. Rhodes, that this switchboard work was currently and now under way in your engineering department?" "Answer: That is true. There has never been a time since my connection with the General Staff when that work has been more active than it is at the present time." Is that correct?

A. I think it probably is.

"Question. The company is now receiving the benefit of the economies produced in those ways, the associated companies?" "Answer. Yes, sir." Is that correct?

A. I assume so, yes, sir.

Q. At that time the company that had made the application was the Cleveland Telephone Company, was it not?

A. I presume so. If that is the record, I will take your word for it.

Q. Cleveland Telephone Company?

Mr. Burr: Yes.

The Witness: I do not question it at all.

Q. Now, Mr. Rhodes, can you tell the Commission what [fol. 8914] and how in any way the company, the Cleveland Company, has benefited in any wise by that great activity?

A. Well, I have not prepared myself on anything special.
Q. I asked you if you could and your answer is what?
A. I can give you a couple of instances.
Q. Well, that is what I want. On switchboard now?
A. Yes.
Q. That is all right. Give them.
A. Would you like to have them?
Q. If you know, yes.
A. Yes. One thing that has been done, in trunks of unusual length, where the ordinary central office apparatus does not operate satisfactorily, and it is necessary to install auxiliary equipment at the outgoing end, there is a new arrangement developed that reduces the first cost of this equipment.
Q. Is that switchboard?
A. Sure. Trunk equipment is part of the switchboard.
Q. Go ahead.
A. And a new arrangement has been developed whereby during periods of moderate load, call circuit positions may be vacated and the trunks at that position transferred by the operation of a key, so that the trunks in one half of the position are handled by the adjacent operator.
Q. That is the work that was going on in the General Staff previous to January, 1920, is it?
A. I cannot say definitely, but I think it is.
Q. Now, Mr. Rhodes, just be fair with me?
[fol. 8915] A. I am trying to be fair.
Q. I asked you a simple question.
A. That is work that has been done in the last two or three years. Now, whether it was actually under way at that time I cannot tell, but I am merely mentioning that as an example of the continuous work on that subject.
Q. But will you please remember I am not questioning you on direct examination. I am cross-examining you, and I premise—make my premise and ask you to answer those and not what you know of something later. Can you say——
A. Not definitely.
Q. Let me ask a question so that the record is clear.
A. Yes.
Q. Can you say now in what way the Cleveland Company or the Ohio Bell Company's properties in Cleveland have benefited since January, 1920, by work that was going on at the time you testified here January 14th, 1920? That is my question.

A. I can only answer that, sir, in general terms, that the development work on that subject is constantly going on, affecting all portions of the equipment.

Q. That is all on that. Now, Mr. Rhodes, in that same case at page — we seem to have lost the page—do you recall now whether or not you did testify in that case as to the per station cost to the Cleveland Telephone Company under the four and one half per cent contract?

A. I don't recall.

Q. You put in an Exhibit, page 46[illegible], and Mr. Wilson [fol. 8916] stated: "I believe the record shows that the amount of the four and one half per cent payment, figured against the number of stations, comes down to $1.78 a year. I am not quite sure, Mr. Marshall, but I think that is about the figure." The question is to you, Mr. Rhodes, "And of that 98 cents in your judgment would represent what it cost the Cleveland Telephone Company to furnish the instrument service alone." "Answer: Yes." Is that correct?

A. I think so.

Mr. Shuler: Now, Mr. Burr, will you furnish me—I was going to ask this witness a question, but there is one figure left out of my set of figures, so I cannot ask him, but I would like to have the sum paid by the Cleveland Metropolitan Company to the A. T. & T. for the year 1923 by virtue of the four and one half per cent contract. You know the Bell Company keeps those records separate and apart from its bookkeeping?

Q. Mr. Rhodes, did you testify that you understood all the license contracts were alike?

A. Why, I do so understand, with possibly one or two exceptions, small exceptions.

Q. Are those exceptions in New York state?

A. Not as far as I know.

Q. Do you know that the New York Telephone Company furnishes these instruments to its connecting and controlled companies at 75 cents a year?

A. I don't know, but I see no reason why they should not.

Q. Do you know whether or not the 22 gauge wire was used by the independents about or previous to 1900?

[fol. 8917] A. Not the kind of fine wire cable used in 22 gauge wires that I was talking about.

Q. Just answer the question and I am satisfied.

(Question read.)

A. Now, you see the 22 gauge wire—not the 22 gauge wire I was talking about, but possibly a 22 gauge wire was used. Possibly so. It was used in the Bell system generally, long previous to that time, but not the kind I was talking about.

Q. And I believe you say that these things, 22 gauge, phantom coil, bi-polar receivers and desk stands, have been and are available to the independent companies?

A. Of certain types, yes.

Mr. Shuler: I think that is all.

Cross-examination.

By Mr. Kinnison:

Q. In getting the relation between the Western Electric and the A. T. & T., do I understand you to recite as one of the benefits to be conferred by the A. T. & T. that it provides a purchasing agent for the associated companies?

A. The Western Electric Company does so act.

Q. I mean did you recite that as one of the benefits to be conferred by the license contract provisions?

A. I did not so state, but I think it is.

Q. You think it is?

A. I think it is.

[fol. 8918] Q. You did so state in your testimony in a recital of the benefits the A. T. & T. confers to its associated companies, the benefits of the common purchasing agent. Didn't you so testify?

A. I don't recall that I did in that language. But I think the fact that its purchasing arrangement does exist is a benefit.

Q. The purchasing arrangement is self-sustaining, is it not, from the Western Electric Company?

A. Yes, sir.

Q. That is they are fairly paid and compensated for acting as purchasing agent?

A. I think so.

Q. There would be no need for any additional compensation to be paid to the A. T. & T. for securing a common purchasing agent?

A. I should not so regard it, that there was.

Q. It should not be classed as a benefit?

A. I think it is a benefit that it was set up.

Q. That is to say, you think the providing of a common purchasing agent who is fairly compensated for the purchasing that he does is a benefit?

A. I think it is a benefit to the associated companies. Somebody had to set the arrangement going.

Q. Somebody such as the A. T. & T. Company would be called upon to pay for finding a common purchasing agent for them?

A. I should not say that they were called upon to pay for it. It is simply a benefit that does flow out of the arrangement. I do not think you can specifically evaluate some of these items, of which that is one.

Q. As a matter of fact does it deserve an evaluation?

[fol. 8919] A. It is a benefit. I do not know how to evaluate it, except I do know that the associated companies are saving large sums of money by concentrated purchasing through the Western Electric Company.

Q. And isn't the relation which they have with the Western Electric Company one which any independent company would be glad to assume with them, to act as purchasing agent for them?

A. It might be so.

Q. Then the A. T. & T. confers no benefit, does it?

A. I think there is a benefit there, and whether it would have occurred if there had not been the license contract, I am not saying in this answer.

Q. Tell me what the benefit is, I mean as being given to the company by the A. T. & T.

A. Whatever benefit there would be in that would be the fact of supervising the relation, which the A. T. & T. Company does. It has an assistant vice president who looks at the matter from the associated companies' point of view, to be sure that there are receiving the full benefits.

Q. Do I understand you to say that the A. T. & T. supervises to see that the associated companies are fairly treated by their common purchasing agency?

A. It does. It checks up the Western Electric prices and their basis of prices.

Q. That is one of the benefits?

A. It is.

Q. Passing on to your patents, Mr. Rhodes, how many pat-

ents did you say the A. T. & T. held or controlled at the present time? Just approximate it? 4,000?

A. Yes, nearer 5,000. I would rather give it to you ac-[fol. 8920] curately. On January 1st, 1924, there were 4,768, and there were 2,742 applications pending.

Q. Now, do you know as of your own knowledge how many of those patents the A. T. & T. Company has actually put into use?

A. As I told you it was somewhere under a thousand that were actually employed in specific apparatus.

Q. Of a varying degree of apparatus, I suppose?

A. Yes.

Q. These other patents which are not in use, as I understand you to say, you simply patented or obtained control of to prevent somebody else from keeping you perhaps from using them?

A. That is one of the purposes, so that we will be free.

Q. Quite an item of your research expense goes into these patents which are presently not available?

A. I would not say a large proportion of it. I do not know what the figures are. But we do not purchase very many of the patents. They are mostly patents devised within the system.

Q. The ratio of a thousand to five thousand would be fair?

A. Oh those that are actually in use today in specific apparatus, that is right, yes. The others are for the protection of the development of the art in the future.

Q. That is to say, your history shows at the present time you are obtaining control of five patents for the use of one?

A. No, I should say they are all in use, but there are only about a thousand of them that result in specific apparatus.

[fol. 8921] Q. Tell me how they are in use.

A. They are in use in protecting the lines of development.

Q. Protecting them?

A. Yes, so that we should be free to take the same method in all matters and not have to recommend something that is inferior because there is a patent that somebody else might take out covering this same thing that would prevent our using the best.

Q. Actually it would prevent an independent inventor going forward and developing along the lines of the four or five you hold in reserve; isn't that the practical effect of it?

A. It might be or it might not be. The purpose I am quite sure is not that. But the purpose is so that we will not be

held up in our development work by some outstanding patent that somebody might want an exorbitant price for.

Q. To protect yourself you have to bar the other man?

A. I do not think it bars anybody. Anybody is free to go ahead and invent anything he wants to.

Q. If I understand, your theory of it, you hold it to protect yourself; if it did not bar the other man, it would not protect you?

A. The protection is it does not allow somebody else to prevent our doing what we want to in development.

Q. And it works the other way, that it prevents them from going beyond your patent?

A. If somebody comes in contact with our rights under a patent which we have, he would not be able to use it.

Q. You are using actually in your physical operation of [fol. 8922] the company, one out of five.

A. I think that is right, yes.

Redirect examination.

By Mr. Burr:

Q. Mr. Kinnison referred to independent telephone companies availing themselves of the services of the Western Electric Company in the matter of purchases. What is the fact as to whether or not independent companies have the benefit of prices paid to the Western Electric Company by the associated companies?

Mr. Kinnison: You are mistaken if you are quoting me. I did not raise that question.

Mr. Burr: You did not say that, no, but you referred to an independent company which might avail itself of the purchases made by the Western Electric Company if I understood your question?

Mr. Kinnison: No.

Q. Then I will ask you this question. Have the independent companies the benefit of the same prices for telephone material sold and furnished by the Western Electric Company as the associated Bell companies have?

A. I understand not.

Q. In which case are the prices lower?

A. I understand that the price to the associated company is always as low——

Mr. Shuler: I object.

[fol. 8923] Mr. Kinnison: He has covered that once in the record.

Mr. Shuler: I object on the ground that he doesn't know.

Mr. Burr: Let us hear his answer.

Mr. Schuler: It is hearsay.

Mr. Burr: No, it is not.

The Witness: I know it as I know many things, because it is part of my business to know, being in the telephone business, and I know that the price to the associated company is always as low as, and generally lower than, the price to the independent companies.

Recross-examination.

By Mr. Shuler.

Q. Have you seen bills rendered to independents and to the associated companies for the same article?

A. No, my knowledge comes——

Q. You have answered my question, Mr. Rhodes.

A. Well, I have not seen bills.

Q. Do you know Mr. Rhodes that the Western Electric does not charge the associated company the exact price it pays for the article plus the commission?

A. No, I do not know that it does not charge that.

Q. Do you know that if the Western Electric Company buys coal for an associated company and pays $4.00 a ton for it, less a ten per cent discount, so that it actually pays $3.60 [fol. 8924] a ton for it, that it sells it to the associated companies at $4.00 a ton plus a commission?

A. No, I do not know that.

Q. Don't you know that that was testified to in the New York case?

A. No.

Q. You did not hear it?

A. I did not hear it.

Q. You did testify at that case, did you not?

A. I did.

Q. If Mr. Sylvan so testified in that case, you think it would be true, do you not?

A. I think Mr. Sylvan's testimony is true, yes. I did not hear it. But he is a truthful individual.

Q. Now, I do want to ask you a question. You have traveled throughout the United States on telephone matters quite extensively, have you not?

A. Yes.

Q. You have testified in a great many cases on behalf of the associated companies?

A. I have in a number, perhaps 25.

Q. And the A. T. & T. always paid those expenses, did they not?

A. I put my vouchers in to the Chief Clerk of our department. I don't know what becomes of them after that.

Q. Are you familiar with the character of service rendered by the independent telephone companies in Michigan and in Nebraska?

A. No.

Q. You are not?

A. No.

Q. So that if those commissions say that the services rendered by the independent companies in those states are equally as good as that rendered by the Bell Companies in [fol. 8925] those states, you are not in a position to either affirm or deny that statement

A. I do not know the character of the service they furnish, no.

Mr. Shuler: That is all.

Cross-examination.

By Mr. Gentsch:

Q. You testified before the Utilities Commission of Illinois in the Chicago case, did you not?

A. Yes, I have.

Q. You know that there was certain testimony introduced in that case that showed that 97 per cent of the profits of the Western Electric Company were derived from sales to the A. T. & T. Company and its subsidiary companies, do you not?

A. No, I do not know that.

Q. Do you know what proportion of the profits or business of the Western Electric Company is done with the A. T. & T. and its subsidiaries?

A. No.

Q. Didn't you know that the testimony was given there before the Illinois Commission that notwithstanding the fact that 97 per cent of the profits of the Western Electric were derived from the sales to the A. T. & T. and its

subordinates, that that covered only 72 per cent of the business which the Western Electric did?

A. No, I did not know that. I went there and testified and came away. I don't know what the rest of them did.

Q. You would not say that that was not true, would you?

A. I cannot say one way or the other about it because [fol. 8926] I do not know.

Q. Well, you know that the A. T. & T. owns approximately 98.99 per cent of the Western Electric, don't you?

A. I think that is right, of the common stock, yes. I think that is right. I understand that to be the case.

Recross-examination:

By Mr. McConnaughey:

Q. Mr. Rhodes, in your direct testimony at page 401 you told of the different bases of compensation for the instrument service at various times during the history of the Bell companies. I think you stated that the original charge was $14.00 per year per set of instruments?

A. That is right.

Q. It was adjusted at different figures and on different bases from time to time from that time down to 1902, when the four and one half per cent of the gross receipts was fixed as the basis?

A. That is right.

Q. What was it just prior to the change in 1902 when the four and one half per cent was adopted?

A. I cannot tell you, except that it is my understanding that it totaled a larger amount to the American Company, that is, the change at that time to the four and one half per cent basis produced a reduction in the amount the associate companies paid, but as to what the basis was I cannot tell you. I don't know.

Q. Do you know why four and one half per cent was fixed as the basis?

A. No, sir.

[fol. 8927] Q. Will you procure and put into this record a statement of the various bases of compensation from the beginning down to the present time for each year, together with the gross amount that was paid to the Bell Company, either the American Bell or the American Telephone & Tele-

graph Company, for each year, on account of these license contract services?

A. For all time you mean from the beginning?

Q. Yes, from the beginning down to this time.

A. I can only say as I have for the other questions that I will tell my superior officer I have been requested to do that.

Mr. McConnaughey: We ask the Commission to direct the witness to procure that information.

Commissioner Poor: I do not know. He has not testified that that information is available to him or in his possession. We do not want to try to compel a witness to produce something that is not within his power.

Mr. McConnaughey: It is just a method of asking the Commission to ask the Ohio Bell to produce this information.

Commissioner Poor: That might be one way of doing it, but we do not want to direct the witness to produce something that is not in his power.

Mr. McConnaughey: Let's see what Mr. Rhodes can do, and then we will take it up later with the Commission in some other form.

Mr. Shuler: You can report to Mr. Burr within a week whether or not you could obtain it or couldn't you do it within a day or two?

[fol. 8928] The Witness: I will simply do the best I can. I will report that I have been asked to produce that information. I haven't it.

Recross-examination.

By Mr. Gentsch:

Q. I want to ask you another question, Mr. Rhodes. Don't you know that the uncontradicted testimony in the Chicago case before the Utilities Commission showed that the stockholders of the Western Electric Company had received all of their investment back plus $12,000,000, plus eight per cent per annum upon the investment up to the time that testimony was given in 1920.

Mr. Burr: I object to the question.

A. I don't know anything about it.

Q. Don't you know that that is the fact?

A. I don't know anything about it.

Q. That is one of the things they did not tell you.

A. Who did not tell me?

Q. Either the A. T. & T. or the Western Electric?

A. As I told you I went out in that case and testified and came away. I don't know what else went on in the case.

Q. You did not hear any talk out there about there being any such uncontradicted testimony before that Commission?

Mr. Burr: It would not be competent for him to testify that he had heard the testimony.

[fol. 8929] Mr. Gentsch: Well, if he knows—that is what I am asking him—if he knows whether those are the facts or not.

Mr. Kinnison: He has testified that the relation between it and the associated companies was upon a reasonable basis.

Commissioner Poor: He has answered this question, that he does not know. Any other cross examination of this witness? Have you, Mr. Hagelbarger?

Mr. Hagelbarger: No.

Cross-examination.

By Mr. Miller.

Q. Do you have supervision of the purchasing of office supplies and appliances?

A. Do I?

Q. Yes.

A. I do not.

Q. You testified in direct that so much a year was saved on items like that, writing paper, pencils, typewriters, stationery?

A. Yes.

Q. You have charge of that?

A. No, I got that information from a man named Lyon, who had charge of that information.

Q. Whether it is correct or not you do not know, only that that is what he reported to you?

A. Yes,

Q. You do not know how he got those figures?

A. No.

Commissioner Poor: Any other questions of this witness?

[fol. 8930] Mr. Gentsch: We may want to call him back later for further cross examination. We would not want him to be excused. We do not want the Commission to close the door, because there is certain of his testimony, a large part of it, that we cannot cross examine on at this time without further information.

Mr. Burr: My understanding was that the witness was to be cross examined at this time, and that was to end the matter.

Mr. Gentsch: Sure, that is what you want to do, to end it, and end it just as quick as you can. But we haven't got certain facts upon which to base certain questions.

Commissioner Poor: We want to keep the proceeding as regular as we can. The original direct examination was sometime ago and the intermediate time was allowed to prepare for the cross examination. If anything specially comes up requiring information from any source, you can get it and the Commission may grant your request.

Mr. Gentsch: Now, that we do not have any misunderstanding about this proposition, is the Commission going to rule that we cannot call back any of these witnesses for further cross examination after there has been an opportunity, for instance, to check the books, the inventories and the expense accounts. It is manifestly impossible for anybody on this side of the table to intelligently cross examine anybody upon the great mass of testimony that is in here, because we have had no chance to go into the basic facts and investigate them.

[fol. 8931] Commissioner Poor: The Commission has not ruled that way at all.

Mr. Gentsch: I did not think so.

Commissioner Poor: We have tried to indicate, with this time to prepare for cross examination, we want to keep the matter as orderly as we can, and just as fast as we can cross examine and conclude with the witnesses, we want to do it. If the counsel have anything that they desire to cross examine with reference to further, after he has been produced here, by submitting that to the Commission, if they feel that that is reasonable and the witness should be recalled the Commission will grant that privilege.

By Mr. Shuler:

Q. I believe I asked you, did I not, if you would make an effort to bring certain information to us relative to the amount of revenue under the four and one half per cent contract, and also the amount of the expenses of the General Staff, and you said you would inquire of the proper officers or an officer, and let me know?

A. That is right.

Q. Have you made that inquiry or request?

A. Yes.

Q. What was the response?

A. I took the matter up with Mr. Burr. I have not undertaken to ascertain the cost to the American Company because Mr. Burr advised me that the matter was irrelevant to this case. I also took it up with our Vice President and General Solicitor, Mr. Bracelen of the company, and he sustained Mr. Burr's judgment.

Q. So then you did not ask any officer of the A. T. & T., for instance, Mr. Gifford?

A. No, I did not go beyond Mr. Bracelen.

[fol. 8932] Q. Your general solicitor?

A. Yes.

Mr. Gentsch: That comes in in line with my motion yesterday. We will try and have that formal motion ready to present to the Commission tomorrow morning. This testimony makes it very important.

Mr. Burr: Let the record show that we will not probably attempt any redirect examination at this hearing, with the idea that we want to get these witnesses through their cross examination as fast as possible.

Mr. Gentsch: For the purpose of the record—I am not asking the Commission to rule on it now—but I do ask, and I am moving that all of the testimony of Mr. Rhodes with reference to the alleged value of the alleged services rendered by the A. T. & T. Company be stricken out as immaterial, irrelevant and incompetent in this case, his direct and cross. I will urge that later, but I want to make the record right now.

[fol. 8933] And also G. A. Kositzky, recalled as a witness, for the purposes of cross-examination, continued his testimony as follows:

Cross-examined by Mr. Shuler:

Q. Mr. Kositzky, you are the same Mr. Kositzky who testified on behalf of the telephone company several weeks ago?

A. Yes, sir.

Q. In that testimony you testified to considerable length as to your past experience. Am I correct in interpreting that to the effect that your experience has been that of a construction engineer, operating engineer, and, if you please, as a financial engineer.

A. Why I don't know about the financial engineer, Mr. Shuler. I have been engaged in all kinds of telephone engineering work.

Q. You would say you are both a constructing and operating engineer in relation to telephones?

A. That is right. I merely forecast the company's requirements, financial requirements, in connection with our provisional estimates. In that respect I have knowledge as to the money required for construction purposes.

Q. But you are and consider yourself a construction and an operating engineer in telephony?

A. Yes.

Q. Now, you testified as to the value somewhat of the services of the A. T. & T. General Staff. You spoke particularly about their making out income tax returns?

A. Yes.

[fol. 8934] Q. Mr. Kositzky, are any of the Bell Companies that you know of companies that operate without any net profit?

A. Operate without net profit?

Q. Yes.

A. Yes.

Q. That is all. Then it is to the great advantage of the A. T. & T. Company to make out a consolidated return, is it not?

A. I do not believe they make out a consolidated return. I believe they make out a return for each company. It is for uniformity's sake.

Q. Don't you know as a matter of fact that their income tax return is made out as a consolidated company?

A. I do not know.

Mr. Gentsch: I object to Mr. Burr shaking his head.

Mr. Burr: My head did not move. If it did it was altogether automatic.

Mr. Gentsch: You may not have done it intentionally, but three or four times this afternoon I have noted that same thing, and I did not say anything about it.

Mr. Burr: You are quite mistaken. My head did not move. I was not paying any attention to the witness. The fact of the matter was I was drawing pictures on my pad.

Mr. Gentsch: Please try not involuntarily to shake your head.

Commissioner Poor: I do not know that we can control Mr. Burr's head. It would be improper to attempt to instruct the witness.

Mr. Burr: For me to attempt to instruct this witness by nodding my head would be absurd.

[fol. 8935] Mr. Gentsch: It happened, and I just don't want it to happen again.

Mr. Burr: Probably the motion of my head was exaggerated by the fact that I wear an eye-shade. I will try to hold it stiller than usual from now on.

Q. Is the relation between the A. T. & T. and the associated companies, particularly the Ohio Bell Company, that of a manager or an advisor?

A. Advisor.

Q. Have you seen a letter recently sent out—I don't want to put it that way, because that assumes. Put it this way. Do you know whether or not recently the New York office, the American Company, has sent a letter to the various associated companies, asking them, requesting them, to make immediately application for increased rates?

A. No, sir. I have seen no such letter.

Q. You have read the report for 1923 of the American Telephone & Telegraph Company?

A. Yes, sir.

Q. Did you read at the bottom of page 9, in which they say, having spoken of inadequate rates, "Where such situations exist or arise our associated companies in those sections or localities will take steps to correct them, and it is expected that with those increases in revenue no general increase over present rate levels will have to be undertaken in 1924?"

A. I remember reading that, yes, sir.

Q. Doesn't that to your mind show that the New York Company does do some dictating?

Mr. Burr: I object to the question.

Mr. Kinnison: That is a fair question.

[fol. 8936] Mr. Burr: It is for the Commission to decide.

Mr. Kinnison: No, it is for cross examination. The witness has committed himself to the fact that it was advisory and he has a right to cross examine him further.

Mr. Burr: Counsel is asking the witness to construe a sentence or sentences in the annual report. If any such construction is to be made that certainly is the province of the Commission.

(Question read.)

Mr. Kinnison: That is a fair question. He is quoting from the official record of his company once removed.

Mr. Shuler: I will add to that question——

Commissioner Poor: Just a minute.

Mr. Shuler: I want to add some more from the report. I want to add to that question also from page 17 of the report, where they say, "In the last annual report we referred to the effort the associated companies had made during the year to bring the rates up to the points demanded by the prevailing high costs of labor and materials. We were able to report satisfactory progress at that time. During the past year this work has been continued in states where rates were still below the minimum reasonable level, in the conviction that the telephone service must be made self-sustaining in each state."

I will now await the ruling on the question.

Commissioner Poor: I think the witness may answer the question. The Commission will give it what weight it should have.

Mr. Burr: Note an exception.

[fol. 8937] The Witness: I have nothing to do with the management of the company, and if any such instructions are given, I know nothing of that. At least there were none to my knowledge.

Mr. Kinnison: He does not answer the question, Mr. Shuler.

Mr. Shuler: No, I know he did not.

Q. You do not think the language here, our associated companies in those sections or localities will take steps to

correct them," referring to inadequate rates, can be construed to the effect that the New York Company does direct the associated companies in relation to management or obtaining proper rates.

Mr. Gentsch: You mean the New York Company or the American Company?

Mr. Shuler: The American Company.

Mr. Burr: I make the same objection.

The Witness: I cannot answer that question, Mr. Shuler.

Q. Mr. Kositzky, you have also acted in many cases as appraisal engineer, have you not?

A. Yes, sir.

Q. What do you think was a proper annual depreciation, a fair annual depreciation rate, ten years ago for telephone companies?

A. You mean the composite rate of all——

Q. Yes, precisely.

A. Higher than today.

Q. Higher than today, but you would not venture a per cent?

A. Between six and seven per cent was the rate commonly used eight or ten years ago. It is about six per cent now. [fol. 8938] Q. Would the percentage of underground cables have any effect on that per cent?

A. Yes.

Q. If there were more underground cables today than there were then, the rate would be lower, would it not?

A. Yes, sir.

Q. Do you know what per cent of the American Telephone properties, the American Company properties, and by that I mean the associated properties, is in underground cables today?

A. I do not.

Q. Don't you know that in the report of 1923 at page 29 they say that 66 per cent of the total mileage is underground?

A. That is not dollars.

Q. I said percentage of mileage; I mean mileage.

A. That means 34 per cent of the wire is aerial and 66 is underground.

Q. No, not necessarily.

A. You are speaking now of the mileage of wire.

Q. This report says that 66 per cent of the total mileage

was of December 31st, 1923, underground cable, that 22 per cent was aerial cable, and less than twelve per cent open wire. Now, in your opinion don't you think this growth in the long life property ought to show a lower annual depreciation rate rather than a higher one?

A. Yes, the composite rate naturally would be lower.

Q. That is right.

A. But there is one thing——

Q. You have answered my question.

Mr. Burr: Wait a moment. Now, explain.

[fol. 8939] Mr. Shuler: He has answered, and he can explain it on your redirect.

Mr. Burr: No, he has a right to explain it right now. Finish your answer, Mr. Kositzky.

Mr. Gentsch: I object.

Commissioner Poor: The witness has a right to explain.

Mr. Gentsch: I note an exception.

The Witness: The introduction of the 24 gauge cable also makes the cost of the underground much cheaper now than it was years ago.

Q. That then would be an additional reason why the rate of depreciation should be lower.

A. Not necessarily. You have more wire mileage underground, but at the same time you have less cost per mile relatively.

Q. Certainly, but the rate of per cent depreciation depends on the age life to a very large degree, does it not?

A. Yes, but you are speaking now of a composite—or a specific percentage.

Q. Have you any idea, Mr. Kositzky, of the amount of underground cable mileage ten years ago?

A. No, I have not.

Q. Do you know how much of the information which your company receives from the A. T. & T. Company was actually developed by that company and how much was developed by an associate company or an independent company or some outside person?

A. I do not, no.

Q. On any one of the things which you have evaluated, do you, of your knowledge know what percentage of the work of development or invention was done by the General Staff?

[fol. 8940] A. No, I do not. I know that——

Q. That answers my question.

A. We get the information from the General Staff.

Q. Do you know what the development of the A. T. & T. General Staff was with relation to '22 gauge wire?

A. Yes, as far as I know they developed the 22 gauge wire.

Q. Answer my question.

Mr. Gentsch: The question calls for yes or no.

Q. Do you know? The question is perfectly plain and calls for a categorical answer.

A. What is the question please?

(Question read.)

A. You mean in cable?

Q. In the 22 gauge wire?

A. As used in the cable?

Q. Cables, yes, sir.

A. They developed the 22 gauge cable.

Q. What did they do? What was the development? What was the development they did?

A. I cannot answer that in detail.

Q. Why do you say that they did develop it?

A. Because that has been my general understanding. I know of no one else who did.

Q. Any development in telephony in the past 20 years has been done by the General Staff; is that correct?

A. Oh, I would not say that.

Q. If you do not know who did develop anything in the past twenty years, you say that it was done by the General Staff; is that right?

A. The Western Electric Company did some of the [fol. 8941] development. The associated companies are responsible for some ideas.

Q. Now, you said in answer to my question about the 22 gauge cable or wire that because you did not know who did develop it you attributed it to the General Staff; is that right?

A. Generally, yes.

Q. Do you think that is a fair answer?

A. That is the best answer—that is my opinion.

Q. Do you think then that any development in telephony that has been made, unless somebody has called it to your

direct attention, that it was done by John Jones, that it was done by the General Staff?

A. No, not necessarily.

Q. You cannot tell the Commission what the particular thing the General Staff did towards developing the 22 gauge cable was; is that right?

A. No.

Q. Yet you say to this Commission that they did develop the 22 gauge cable?

A. As far as I know.

Q. And when you made your estimate of savings on 22 gauge cable you made it on the basis that all of the development of the 22 gauge cable was made by the General Staff?

A. Yes, sir.

Q. Don't you know as a matter of fact that 22 gauge cable was first used——

Mr. Kinnison: Wire.

Q. Wire—was first used by the independents?

A. I do not.

Q. Don't you know that Mr. Rhodes testified here that the General Staff did not claim the credit for the introduc-
[fol. 8942] tion or development of the 22 gauge cable itself?

A. He said—no, I did not hear him testify to that. He said a 22 gauge wire may have been used but the development of the present type of 22 gauge cable was a product of the General Staff.

Q. Wasn't this his language——

Mr. Burr: I object.

Mr. Shuler: I will give it to you. I will quote it from his testimony.

Q. Wasn't what he said this, that the manufacturing process was developed by the General Staff, and that is what he claimed? Do you remember that? If you do not remember it, answer no; if you do remember it, answer it yes.

A. I don't remember that.

Q. Now, you testified about the pole setting truck. Do you know what it costs to operate that truck with four attendants?

A. No, I do not. We are getting those figures now, Mr. Shuler.

Q. You don't know what it costs to set the same number of poles in the regular way you have been doing in the past?

A. Generally, yes.

Q. How much? Seventy poles, I believe, was your——

A. The machine has a capacity of about 75 poles a day, yes, sir.

Q. What would be the cost for setting 75 poles per pole with 30 men?

A. It usually runs about one pole per man per day.

Q. That is how much in dollars?

A. Whatever the wages are. Sometimes they pay——

[fol. 8943] Q. Just take any time, any definite time today.

A. Probably ten or twelve dollars.

Q. Per pole?

A. Yes.

Q. Can you give us an approximate cost with the pole setter?

A. No, I cannot, because the question of the depreciation of the pole setter is quite an important item, and carrying charges on that machine. It costs about $9,000.

Q. Depreciate it in a year, set aside an annual depreciation which will allow you to junk it at a year, what would it be?

A. You would also have to make allowances for rainy weather, cold days, and so forth. The 75 pole capacity is not an average run, but a maximum run.

Q. Then to set 75 poles a day would cost $360.00, present method; is that right? 30 men, and you say you save from ten to twelve dollars a day?

Mr. Gentsch: No, that is not what he said.

Mr. Shuler: He said that the 75 poles would cost from ten to twelve dollars per man day. Now, there are twelve men working one day, 30 men working one day, and 30 men at $12.00 is $360.00 a day, and 30 men at $10.00 is $300.00. That is correct, isn't it?

A. Yes.

Mr. Shuler: He said the pole setter would set 75 poles per day.

Q. Am I right, Mr. Kositzky?

A. As its maximum.

Q. At its maximum capacity?

A. Yes.

Q. That today it takes 30 men to set 75 poles in one day?

A. You are talking about two different things. I said on the average one man could set about one pole per day.

[fol. 8944] You are talking about the machine at its maximum daily output. That machine probably year in and year out will probably set thirty poles per day.

Q. If you will answer my question we will hurry this very much. All that I am trying to get at is, you say a pole setting truck, working with four men will set 75 poles per day maximum?

A. Yes, sir.

Q. You said that under the present system of setting poles it would take 30 men one day to set 75 poles?

A. No.

Mr. Burr: You are shaking your head at Mr. Shuler, Mr. Gentsch.

Mr. Miller: One man per pole per day would be 75 men.

Mr. Burr: $890.00 is the answer you are trying to get at us.

Q. Under the present method——

A. One man on the average will set one pole per day, and this machine will at a maximum set 75 poles per day.

Q. With four men?

A. Yes, sir. On the average we figure that this machine displaces about 30 men, or rather four men with this machine will take the place of 30 men——

Q. How much would that saving be?

A. Oh, I don't know.

Q. But it is very liberal to your side?

A. It was enough to prove in the machine, Mr. Shuler, on that basis, and we purchased the machine.

Q. Can't you give us an approximation? You have had no trouble to find out the saving in the cable, although [fol. 8945] it involved a tremendous amount of work?

A. There is a saving there.

Q. Of how much?

A. A dollar a pole.

Q. $75.00 a day?

A. If they set 75 poles; probably more of a saving then, because it is the maximum.

Q. Mr. Kositzky, isn't my question simple?

A. You are speaking of a maximum day's output of this machine with four men, and I tried to say that this machine does not set 75 poles a day.

Q. I did not ask you to say 75. You said it.

A. That is what it will do as a maximum day's output.

Q. Now, Mr. Kositzky, I would like to have the record show in a very concise way a fair statement from you as to the saving in setting 75 poles or let us make it 70 poles; let us say the machine only set 70 poles. Now, give me just briefly and concisely, being very fair to your side, what would the saving be per day, using the truck as against the number of men you use today to set 70 poles?

A. You would have to let me use my paper and pencil to figure it out.

Q. Will you do it tonight and bring it in the morning?

A. All right.

Q. Now, you did testify or in your appraisals you did state you did not use that truck method of setting poles, I believe?

A. No, sir.

Q. Your appraisals then include costs according to the way and as the plant actually was constructed; is that correct?

A. No, the appraisals are the way we would set the poles today if we introduced any labor saving devices—I will [fol. 8946] correct my former statement; on the reproduction theory it is the way we would do the work, not the way the work was done.

Q. Why didn't you use the truck in the Dayton and other cases?

A. Take in Cleveland, for instance, we couldn't very well run this truck in a man's back yard.

Q. You have not appraised Cleveland, have you?

A. No.

Q. I did not ask you about Cleveland. We are in the toll line case remember, Mr. Kositzky?

A. That is where this machine is now being used, on the toll line plant.

Q. But you do not use it in the toll line case?

A. No.

Q. In your appraisals?

A. No.

Q. When you came to charging overheads in the toll line case, what did you adhere to, the overheads that were charged actually in the line or what it would cost today to put up a brand new property or plant?

A. The overheads that are experienced today.

Q. You included the actual amount spent by the company at the time it constructed it?

A. No, that would be original cost. This is reproduction.

Q. You also in your appraisal of the toll line property constructed it right through and included interest during construction, did you not?

A. Yes, sir.

Q. Although at the time it was constructed it might have been constructed piece meal; is that right?

[fol. 8947] A. I do not know how the plant was constructed.

Q. You are also in your appraisal of the toll line property including taxes during the period of construction?

A. Yes, sir, that is right.

Q. When the General Staff comes out here, Mr. Kositzky, to advise with you, who assumes responsibility for that expenditure as to the future, you or the General Staff?

A. What expenditure? This man's traveling time?

Q. No, he comes out here and advises you to make a certain expenditure.

A. He does not advise us to make a certain expenditure.

Q. Does he order you?

A. We usually have a problem in which we consult with him how to solve that problem.

Q. Supposing his advice to you is to go ahead and make the expenditure and you go ahead and make the expenditure; who assumes responsibility in the future if it is a failure or a success?

A. I don't know of any cases where they have instructed to do a thing any particular way. It is usually left up to us to decide.

Q. Who is responsible for the way in which the exchanges in Dayton and Canton have been unified?

A. The Ohio Bell Company.

Q. Yourself then?

A. I had a great deal to do with it, yes, sir.

Q. Did the A. T. & T. General Staff help you?

A. Yes, sir.

Q. To a very considerable extent?

A. Yes, sir.

[fol. 8948] Q. How many sets of transmitters and receivers and induction coils now in use in the Ohio Bell System were actually furnished by the A. T. & T. Company?

A. I haven't the exact figure, Mr. Shuler. I don't know exactly.

Q. What figure did you use when you made your cost to the Ohio Bell Company if it furnished its own?

A. I used the total instruments.

Q. In service?

A. In service.

Q. Now, that was approximately 500,000, was it not?

A. Plus the stock and the reserve.

Q. How many of those instruments as of June last year were instruments that were not furnished at all by the A. T. & T. Company?

A. I could not tell you.

Q. Then how can you tell this Commission what the saving to the Ohio Bell Company was by this service on those instruments?

A. The A. T. & T. stands ready to furnish us instruments for every station in the state, although there are a number now that they are not furnishing. Yet just as rapidly as they are being replaced——

Q. When those——

Mr. Burr: Let him finish.

Mr. Shuler: I thought he was finished.

The Witness: Just as rapidly as we take in these telephones that have instruments other than Western Electric make or American Bell instruments, they are furnished.

Q. And when you take them out, the old Ohio State, you junk them, do you not?

A. Most of them.

[fol. 8949] Q. How do you treat fixed capital account in that case?

A. It is written off of the books.

Q. When you appraised the Dayton property did you give any value to the sets of the Ohio State?

A. I couldn't say just how Mr. Williams did handle that.

Q. You didn't have anything to do with that?

A. Mr. Williams made the appraisal.

Q. What is the actual amount of taxes paid by the Ohio Bell Company on the instrument sets owned by the A. T. & T. Company?

A. I don't know.

Q. Have you any idea?

A. No, sir.

Q. Then why in your set-up did you charge—you know that they do pay the taxes on them, do you not?

A. I think they do, yes, sir.

Q. Then why did you charge two per cent as part of your estimate as to the cost to a person in case he were to put in his own?

A. The tax rate is something over two per cent on the taxable value. It computes about two per cent on the purchase price.

Q. It does? You mean to say all of your property is taxed in the State of Ohio at its purchase price?

A. Well, the rate is considerably over two per cent on the tax value.

Q. Yes, but what is your tax value?

A. I don't have that.

Q. What does your tax value represent to the cost price?

A. It is less than the cost price and the rate runs over two per cent.

Q. Will you furnish us with the actual amount of the [fol. 8950] A. T. & T. sets furnished of the Ohio Bell system and the independent, too?

A. As of any particular date?

Q. June 1st last year is all right. Make it June 1st and January 1st. Mr. Kositzky, you have had tremendous experience in consolidations, have you not?

A. Yes, sir.

Q. Unifications?

A. Well, I don't know just what you mean.

Q. We are unifying in the State of Ohio, are we not?

A. The service, yes.

Q. Did you ever have any unification experience before this unification in Ohio within the past few years?

A. Yes, sir.

Q. Considerable?

A. Yes, sir.

Q. In Brooklyn, didn't you?

A. No, sir.

Q. New York?

A. No, sir.

Q. New Jersey?

A. No, sir.

Q. Where?

A. Indianapolis, Indiana, points in Missouri, Kansas and Texas. Some in Illinois.

Q. Now, Mr. Kositzky, you testified that the A. T. & T. were pioneers in advocating the joint use of poles, and you connected that with work of Mr. Rhodes as early as 1910. Later on you indicated that such joint use of poles is advantageous in respect to the frequent saving of two lines of poles, with their first cost and carrying charges; is that correct?

A. Yes.

Q. Has it been the practice of the Ohio Bell Company and its predecessor, the Central Union and the Cleveland Companies, since 1910 to take advantage of every oppor- [fol. 8951] tunity to constructor use poles jointly with Electric Light Companies and other companies such as telephone and telegraph?

A. Generally, yes.

Q. On your appraisals how did you appraise the poles in that kind of a case?

A. Strictly according to ownership.

Q. Where one company owned and leased to the other, you credited it to the owning company?

A. Yes, sir.

Q. So that if out of a thousand poles 500 of them were owned by someone else, you only charged to the Long Lines Company 500 poles?

A. What do you mean by the Long Lines.

Q. The toll lines. We are in the toll line case.

A. I don't know. There aren't so many joint poles in the toll lines. The joint lines are mostly in exchange.

Q. Let's get the principle established. I don't know whether there are many or not. Let's get the principle established. That is what you did.

A. Are you talking about joint poles with electric light companies.

Q. Any company?

A. I thought you mentioned them?

Q. I mentioned electric light companies and telegraph companies?

A. Yes, we have joint poles with electric light and other telephone companies.

Q. At any rate you appraised the property of the Ohio Bell toll lines department and let us say there are 10,000

poles in that line, one thousand of which were owned by other companies. Did you in your appraisal include those thousand poles as a part of the reproduction cost new of the toll line property?

[fol. 8952] A. We should not and I do not believe we did.

Q. What is that?

A. We should not and I do not believe we did.

Q. You do not believe you did?

A. No, sir. It is not our practice and we should not include it in our appraisal.

Q. And it should not be part of the reproduced property, should it?

A. No, sir.

Q. To that extent it is reproduced as you find it, part owned and part leased?

A. Yes, sir.

Q. Now, have you done the same thing in your appraisals in the cities?

A. Yes, sir.

Q. Isn't it the present policy and practice of the Ohio Bell Company to use joint poles wherever it is possible?

A. Well, possible and practicable.

Q. There hasn't been any other companies that you know of opposed to such a policy has there?

A. Why occasionally we have a case with an electric light company.

Q. No, you get my position wrong. The question is, Mr. Kositzky, do other telephone companies generally oppose the policy of joint use of poles?

A. With the Ohio Bell Company?

Q. No, no, get me. All telephone companies have poles?

A. Yes.

Q. Now, all companies that operate telephones themselves, do they have any objection, if the other fellow is willing, to putting their lines on the other fellow's poles and making joint use of poles? Do I make myself clear?

A. I think so, Mr. Shuler. I know of cases where the [fol. 8953] other fellow did object to it.

Q. I did not ask you that question. Do any telephone companies have objection as a policy to placing their lines on other poles, if the other fellow is willing?

A. If conditions are satisfactory there should be no objection.

Q. Now, do you find many people owning poles who object to the telephone companies using their poles?

A. Frequently.

Q. Why do they object, Mr. Kositzky?

A. The question of capacity of the line, the question of maintenance of the line, the financial stability of the other company.

Q. Now, Mr. Kositzky, to what extent in Ohio do you find objection from the other fellow?

A. I cannot cite any specific case, but I can say cases——

Q. Let's put it this way then. Have you not had a case since you have been in Ohio where you wanted to have joint use and have been refused by the owner of the pole line?

A. Yes.

Q. How many times?

A. I cannot state.

Q. What are you doing, if anything, in the way of obviating any such objections? Did you answer that question, Mr. Kositzky?

A. No, I did not.

Q. Do you understand the question?

A. I think I do. We try to bring about reasonable arrangements where it is desirable to have joint construction, to remove the obstacles that make it undesirable or questionable.

Q. And you pretty generally succeed in obtaining their consent in such cases, do you not?

A. Not exactly. In many cases it is a question of finance, [fol. 8954] and it requires a stronger pole. The other company is not ready at this time to assume its financial responsibility on the additional construction costs or costs at this time.

And thereupon the further hearing of this matter was adjourned to ten o'clock, Wednesday Morning, April 23rd, 1924.

[fol. 8955] Wednesday Morning

April 23, 1924.

And also G. A. Kositzky, resuming the stand for further cross-examination, continued his testimony as follows:

Cross-examined by Mr. Shuler:

Q. Mr. Kositzky, we finished last evening, or rather we were talking last evening about joint use of poles?

A. Yes, sir.

Q. Take in the City of Cleveland for the last ten years, what companies have used in their businesses poles or pole lines?

A. The Cleveland Illuminating Company, The Ohio Bell Company, The Ohio State Company, The Postal Telegraph Company, The Western Union Telegraph, the Long Lines of the A. T. & T. Company. That is all that I can name right this minute.

Q. Those were and are sound financial companies, isn't that true?

A. I think so, yes, so far as I know.

Q. So that because of financial situations you have had no trouble with *with* about joint use of poles, isn't that right?

A. So far as the Ohio Bell is concerned, that is right. I believe the Ohio State had some difficulty with the Illuminating Company.

Q. You do not get my question. My question is this, that all of those companies being sound financial companies, you [fol. 8956] would not have had any difficulty about arranging joint use with any of them because of financial reasons?

A. Generally, no. But I think you have one point wrong, Mr. Shuler, if you will permit me to straighten it out—when I said "financial". Supposing there are two pole lines on one side of the street. One company is ready to rebuild its line. The other company with whom it would be desirable to build this line is not yet ready. Then there would be financial reasons why those particular lines should not be rebuilt jointly today. The company itself may be entirely sound financially. We run into that frequently in connection with these rural companies, companies in rural sections. That is also true of the Western Union and the Postal people. We have difficulties with them on individual lines for financial reasons.

Q. Couldn't that be adjusted by postponement on your part?

A. Not very well. If our poles need replacing today and the other company's poles are suitable for five or ten years

longer, I can see good reasons why they would wish to continue as they are.

Q. Mr. Kositzky, so far as the cities of Ohio are concerned, and by that I mean the larger cities, like Cleveland, Toledo, Dayton, Akron, Canton and Youngstown, are concerned, you do not have very general trouble about arranging for joint use of poles, do you?

A. Yes, we do. We mentioned Toledo here recently, the difficulties there.

Q. You have answered. Can you give us the difficulties in Toledo?

A. It is the restriction, voltage restriction, as covered in [fol. 8957] one of the city ordinances, limiting the voltage of electric light to 300 so far as its use of signal circuits are concerned.

Q. That is peculiar in the State of Ohio to the City of Toledo only?

A. Then we have voltage restrictions in Dayton, for instance, on the part of the Electric Light Company.

Q. How long has that been true?

A. As long as I can remember, five or ten years.

Q. You have been in Ohio for ten years, have you?

A. No, sir, I have been in Ohio about three to five years.

Q. How do you know that it has been in Dayton for ten years?

A. I know this has existed for ten years, five to ten years.

Mr. McConnaughey: That is not by ordinance.

The Witness: No, sir.

Q. Can you give us inventories showing the total number of exclusive Bell poles and the total number of joint poles in Cleveland, Toledo, Akron, Canton and Dayton?

A. Why, I cannot, but I guess it can be done.

Q. It can be furnished, can it?

A. I think so, yes.

Q. Especially it could be furnished us in those cities in which you have recently made appraisals?

A. Yes, I think the appraisals would speak for themselves. We have appraisals on file, I believe, in most cities except Cleveland.

Mr. Burr: Do I understand that it is intended by that [fol. 8958] question to inject into this toll rate hearing the pole inventories that are involved in all of these exchange

cases? Not that we have any objection to anybody having the information, but it increases the size of this record so much, Mr. Shuler.

Mr. Shuler: The only thing is this, Mr. Burr. You put Mr. Crunden on at great length to explain matters that took a day or more, and what bearing it had on the 4½ per cent contract I spoke of at the time. Yet it went on. Further, you put Mr. Kositzky on and asked him a great deal of outside matters. And again, I understood you to say to the Commission in one of your arguments, when we objected to the length to which the hearing was going, that it was agreed that certain of the evidence here could be used in specific cases. I think I am correct in that.

Mr. Gentsch: Any of the evidence here might be used in them.

Mr. Shuler: It is not going to take much time, and that is the reason I ask for it.

Mr. Burr: It is not a matter of time. It is the multiplying of the exhibits. If I correctly remember the record in the pending exchange rate cases, the inventories of these poles jointly owned and used——

Mr. Shuler: But, if the Commission please, I can also further say Mr. Kositzky has further testified that the A. T. & T., through Mr. Rhodes, were the pioneers of this joint use. Now if we could have these appraisals we think we can refute that, and that is another reason why we [fol. 8959] wanted those appraisals, to show that the Independents in Ohio were the pioneers of the joint use, or at least had done considerable in joint use, ten years previously to 1910.

Mr. Gentsch: The record ought to show loud applause at Mr. Burr's objection to increasing the size of the record, having in mind the trunkful of stuff that he brought in here a few weeks ago.

Mr. Burr: That is true. The record is large already.

Mr. Shuler: I am not going to bring it in here. I am asking him to give us this information, is all. We would have been through this whole question at this time without the interruption.

Commissioner Poor: He may answer.

Q. Will you furnish us at your earliest opportunity that information?

A. What are the cities again?

Q. Will you furnish us the inventories at your earliest possible moment showing the total number of exclusive Bell poles and the total number of joint poles in Toledo, Akron, Dayton and Canton, and I would like to have them for Cleveland too, but you need not be so expeditious on it.

A. Those are in the record now; not in this record, but the inventories are matters of record before the Commission. That information is before the Commission.

Q. That inventory shows which are exclusively Bell poles and which are joint use?

A. Joint ownership. Joint use it wont show. You may [fol. 8960] have a joint use where one party owns the pole.

Q. If I am correct, joint use and joint ownership is the same thing, practically speaking?

A. So far as the use of the pole is concerned, yes, but so far as the records go it would be rather difficult to show what foreign attachments, as we call them, would be on a pole where we own 100 per cent of the pole.

Mr. Miller: Let me ask a question there to clear up something I have in mind. In the exchange inventories and appraisals, hasn't it been the policy of your company, Mr. Kositzky, to take the toll poles within the exchange area—to allocate those to exchange, and the toll poles outside of the exchange area to toll?

The Witness: That is, provided they were used by both exchange and toll—according to principal use, that is right.

Q. Mr. Kositzky, you are familiar with the former Ohio State property in the State of Ohio, are you not?

A. Yes, sir.

Q. Did you find that that Company had been practicing the joint use of poles with electric light, telegraph and other companies?

A. Yes.

Q. Will these inventories you spoke of show the former Ohio State and former Ohio Bell separately?

A. I doubt it.

Q. You think they would just show that they are Ohio Bell?

A. They are pretty much scrambled by the time the inventories are taken, but I can answer your question. There [fol. 8961] is a point there that I say is not clear. I mentioned Mr. Rhodes' N. E. L. A. report of 1910. Now I know

that joint use of poles has been in effect prior to 1900. My knowledge as to conditions in Ohio does not go back that far.

Mr. Burr: If Mr. Shuler is laboring under the mistaken idea that I think he is, these inventories referred to by Mr. Kositzky, Mr. Shuler, will show joint ownership and the portion of the ownership of the pole which is in the Ohio Bell Company, but they wont show separately or with any particular designation poles owned entirely by The Ohio Bell Telephone Company but probably jointly used by some other company without the other company having some ownership in the pole. In other words, where the Ohio Bell Company owns the pole outright, any other attachment of some other company which may be on that pole is there on a cont-act rental basis, or some such arrangement, and is not reflected in the ownership of the pole.

The Witness: Yes, that is right. The inventory would not show that.

Mr. Burr: Do you see what I mean? So it wont show perhaps what you are trying to get.

The Witness: To get that would be an awfully big job.

Mr. Kinnison: Wasn't it brought out that where there was not a joint ownership it was on a reciprocity basis and not a rental basis in the Canton case?

[fol. 8962] Mr. Burr: Not so far as I know. It may have been. I don't know.

Q. Taking Mr. Burr's statement or explanation in the record, what advantage is it to the Ohio Bell?

A. The advantage of having joint use of poles?

Q. Yes.

A. Considerable advantage.

Q. A very considerable advantage, is it not?

A. Yes, where all conditions are satisfactory.

Q. Now just explain it somewhat in detail.

A. The advantages?

Q. Yes.

A. As I explained in the exhibits a few weeks ago, there is, first, the question of safety, the question of lower capitalization, and one question which affects the company indirectly, the sightliness of the streets, for instance in the residential district.

Q. In other words, if the Ohio Bell had made a greater use of this joint use, you could have shown a considerably

larger saving than you do by your exhibit, isn't that true?

A. Oh, there is no doubt about it. It takes two parties, however, to make an agreement, Mr. Shuler.

Q. Is there any saving, Mr. Kositzky, in capitalization when the Ohio Bell owns the poles and another person connects to it?

A. Uses it you mean?

Q. Yes.

A. Yes, if the arrangements are reciprocal, I should say that there was mutual advantages.

Q. To what extent?

A. In another location perhaps the Ohio Bell would use the other fellow's poles so that it would save the investment of a pole for each company.

[fol. 8963] Q. Now, Mr. Kositzky, the real expansion in electric light construction in Ohio began approximately about 25 years ago?

A. I don't know. I think that is about right. Perhaps a little before that.

Q. And the expansion in the telephone business began approximately the same time?

A. I guess so. Before then, I would think; both of them ante-date that.

Q. Suppose, Mr. Kositzky, the Bell Companies in Ohio had begun their pioneering in joint construction of poles at the time of this early rapid expansion and kept it up all through, there might have been another item of savings to include in your schedule of savings, might there not?

A. I cannot say that they did not.

Q. If they had, there would be?

A. The policy has been, ever since I have been with the Company, to go joint, and wherever it is agreeable to the city and the light companies or the other companies involved, generally we have gone joint.

Q. But you have only been in Ohio for how many years?

A. I have lived here about three years and have had to do with Ohio since 1919, five years.

Q. You referred to phantom circuits and you figured savings in your schedule on account of phantom circuits, did you not?

A. Yes.

Q. Do you know when the phantom circuit came into use?

A. I think Mr. Rhodes testified to that, and he is more of an authority on it than I am.

Q. I am asking you for your knowledge.

[fol. 8964] A. It was in use at the time I started with the Telephone Company in 1905.

Q. So far as your knowledge goes, it has been 20 years approximately in use?

A. Yes, sir.

Q. Do you know that the phantom circuit principle was in use for telegraph purposes long before that?

A. Telegraph?

Q. Yes.

A. I don't think so. No, sir, I don't think so. I don't think the Telegraph Company are using phantoms even now for telegraph purposes.

Q. Don't you know that Mr. Edison used the phantom circuits in connection with telegraphy 40 years ago?

A. I think you are talking about multiplex telegraphy now, aren't you?

Q. What is multiplex telegraphy?

A. That is sending several messages over one wire.

Q. That is what——

A. That is not a phantom at all.

Q. But a phantom is making four wires out of two or six out of four?

A. A phantom creates one more circuit out of two.

Q. Right.

A. But multiplex telegraphy merely uses the circuit there and increases its capacity as we do now with carrier current. That is another matter altogether.

Q. Then your answer is that they never have to your knowledge and do not use the phantom circuit in connection with telegraphy?

A. No, sir. The physical characteristics of their wire even today will not permit that. They would have to re-[fol. 8965] arrange all their lines, retranspose them, and except in a very few cases where that has been done for telephone purposes by the railroads or telegraph companies, phantoms are not used for telegraph purposes.

Q. You speak also of the loop and trunk study in your direct testimony?

A. Yes, sir.

Q. You say that you found the Ohio State Company's

plant was designed and arranged very uneconomically and you mentioned larger wires than necessary in some places and in other places conductors too small, did you not?

A. That is right.

Q. Did you mean to confine your statement as to uneconomical design and arrangement to this matter of wires or conductors?

A. Both.

Q. Both?

A. Yes.

Q. And perhaps other things also?

A. It is mostly the arrangement of guages, kinds of circuits for various purposes.

Q. You have appraised some Ohio State plants for rate making purposes, have you not, Mr. Kositzky?

A. Indirectly.

Q. What do you mean by that?

A. In Ohio, Mr. Williams has been appraising the property directly, and I have just——

Q. Are you familiar with those appraisals?

A. In a general way.

Q. In connection with the appraisal of any wires that were larger or more expensive than necessary, did you [fol. 8966] appraise them as you found them or according to the proper economical design?

A. As we found them.

Q. As you found them?

A. In every case, yes, sir.

Q. And in connection with any wires that were too small for proper use, did you appraise them according to their usefulness?

A. No, sir, as they found them in every case. May I straighten out a point there, Mr. Shuler?

Q. Mr. Burr will have you do that.

Mr. Burr: If it is part of your answer, do it now. Mr. Shuler will permit that.

The Witness: In this loop and trunk study we did find wire in the Ohio State too large for its purposes; in other cases, wire that was too small; but in the rearrangement of the use of those conductors we put them to their proper use, and working them into the manner in which guages or wires of the various sizes could be most efficiently used.

Q. As you use them now do you mean to say that they are fully useful or that you have made the most possible use of what you found?

A. Well, take a specific example. In Toledo we found the trunk conductors were a little bit heavier than needed for certain grades of trunks and we extended the use of those to the grade of trunk and the class of trunk where those larger conductors are most suitable, and the new cables placed in Toledo were of a smaller guage and take the place of these larger ones, and the larger ones extended, as I stated, so that we are now working the plant, [fol. 8967] you might say, up into its proper subdivisions.

Q. You are getting full effectiveness out of those wires that are too large, are you?

A. Just as rapidly as we can work them over.

Mr. McConnaughey: The terms conductors and wires have been used in the last two questions. Is there any distinction?

The Witness: No, sir.

Mr. McConnaughy: Same thing?

The Witness: Yes, sir.

Q. What do you mean by as rapidly as possible? What determines whether or not you do make the change? That is the question.

A. If we have now trunks that are 19-guage between offices where a 22-guage trunk would be satisfactory, of course we do not immediately spend money to put in the 22-guage trunk and cut the 19-guage trunk dead, but if trunks are needed of a 19-guage character between two, say, more remote points, we will take and place a 22-guage trunk and transfer the use of that 19-guage, by extension if necessary, to the correct distances. In that manner we work the plant into its proper uses. Now we had a wonderful opportunity to do that both in Cleveland and in Toledo in connection with the unification, which required quite an addition of new trunks, and by rearranging the existing trunks in connection with the new work we were able to quite effectively and efficiently re-design or re-arrange the trunk cables.

[fol. 8968] Q. Is this going on quite rapidly or will it require five or ten years to complete it?

A. A great deal of that has taken place now.

Q. Now this expense of change, is that added to capital, fixed capital account, or plant account?

A. Yes, any new plant added goes to fixed capital. And re-arrangements——

Q. Well, now,——

Mr. Burr: Let him finish his answer.

The Witness: And any re-arrangement, of which there is always a minor amount in connection with any new work, that is charged to maintenance.

Q. And labor in connection with that would be added to capital?

A. If it is a capital expenditure, yes, sir.

Q. You stated that there were in Cleveland in 1921, 30,000 Ohio State telephones, did you not?

A. I believe so, yes, sir.

Q. How many are there today?

A. Not very many. I haven't the exact figure.

Q. In your record you said four or five thousand?

A. I think there is less, if anything, today. We lost about 800 the last two months.

Q. Now by that you mean instruments and not subscribers?

A. I mean Ohio State telephones, telephone subscribers connected with the Ohio State plant and getting only service over the Ohio State exchanges.

Q. So that does not mean that there are only 5,000 Ohio [fol. 8969] State instruments in service in Cleveland today?

A. No.

Q. Do you know about how many instruments are in service in Cleveland today?

A. I do not.

Q. You stated that there are about 100,000 Ohio State subscribers—you state that there were about 100,000 Ohio State subscribers. To what time does that refer?

A. I really don't know. There were about 125 or 30 I think in 1921.

Q. About 130 in 1921?

A. Yes, sir.

Q. At the time of the consolidation?

A. Yes, and I don't know how many there are today, but there are less than 100,000, I believe, considerably less.

Q. Do you know what the Ohio State property was appraised at at the time of the consolidation in 1921?

A. I do not.

Q. In the consolidation of the physical properties won't you lose a good many more of the telephones, particularly those that were duplicated, those that were duplications?

A. Why, no doubt there will be some additional loss. Many of those, you know, go from the State plant to the Bell plant, and in the majority of cases the property goes with it; the cables, conduits and so on are now quite generally used for subscribers connected with the Bell exchanges.

Q. Have you any knowledge as to the average book cost of the Ohio Bell property per telephone at the time of the consolidation in 1921, excluding the Ohio State?

[fol. 8970] A. No, I do not.

Q. Do you know the per station average for the entire Bell system?

A. Oh, just approximately. About $160.00, I guess, something like that.

Mr. Gentsch: Does that mean all over the United States?

The Witness: Yes.

Q. Do you know the book cost of the entire Bell System throughout the United States, per telephone?

A. Well, that is what I mean; about $160.00, I believe; I don't know the exact amount. It may be a little less.

Q. You say that the A. T. & T. or the American Company developed a copper steel twisted pair wire. Will you please tell us just what you mean by that statement?

A. That is the steel core with the copper coating and insulated, two wires twisted in pairs, used for drop wire. Is that what you mean?

Q. That is the reason we have asked you the question?

A. That is what I had reference to.

Q. Because of your language in your direct examination.

A. That is what I had reference to, a copper clad twisted wire; what we know as the 17 C. C.

Q. When was that done by the A. T. & T.?

A. I don't know exactly, but it was recommended for use to the asociated companies, if I remember, since 1905.

Q. Since 1905?

A. Or 1809 or '10, along there.

Q. You mean 1909 or '10?

A. Along in there, yes, sir.

[fol. 8971] Q. What do you mean when you say they developed it? Do you mean that they recommended it to the Associated Companies for use?

A. Yes.

Q. Then you don't know anything about what they did in the way of development?

A. Well, they have——

Q. No, I am asking for your knowledge?

A. No, I don't know anything about the details of it.

Q. Roebling is a large manufacturer of wires and cables, are they not?

A. Yes, sir.

Q. Standard Underground *are*?

A. Yes, sir.

Q. Do you know what they have done towards the development of this wire?

A. I believe that these companies did develop or recommend for use the bare steel wire copper clad, but the twisted pair wire I have reference to was used by the Bell Companies before the Independents, to my personal knowledge.

Q. But you don't know who developed it?

A. My information is the A. T. & T.

Q. What was the development that they did, from your information? Now I am asking you for your personal knowledge, Mr. Kositzky?

A. Well, I don't know just what happened in the laboratories, but they sent out the specifications and recommended its use, and the Bell Companies were the first to use that wire, and if the A. T. & T. had not recommended it—at least it was through their recommendation that we started using the wire.

Q. That is right. Now, so far as you know, the American Company recommended it for use to the Associated [fol. 8972] Companies and they used it?

A. After thorough experimentation and finding that it was really satisfactory.

Q. What was the development of it? What do you mean by development of it? Anything more than the American

Company recommended it for use to the Associated Companies?

A. I presume that way—I don't know.

Q. If in your statement of savings you say anything about that particular item it should be withdrawn from the statement because you don't know that the American Company did develop it, is that right?

A. My best information is that they did develop it. I was not with the A. T. & T. and am not familiar with the processes of their organization. It may have been developed in conjunction with the Western Electric Company for all I know.

Q. You say your best information is that they did develop it. Now I have asked you what you mean by the words "develop it". You say you don't know.

A. When you ask me about poles, I don't know.

Q. What was this development then? Let us get that. What was the development that we have been talking about? It was not the putting of the copper on the outside of a steel wire, was it?

A. No. I know that they conducted experiments as to the manner in which a steel core wire would tie up into these knobs or fasteners on buildings and as to how it would stand up under different conditions. Experiments of that kind were conducted by The American Telephone & Telegraph Company. I know that.

Q. Was there ever the slightest restraint on the use [fol. 8973] of this wire by independent companies?

A. I don't know.

Q. Now you state that the difference between 14 copper and 17 copper clad wire is about $1.13 a foot in place?

A. Yes.

Q. For the materials?

A. Per hundred foot in place for labor and material.

Q. But your statement was $1.13 a foot in place for the labor and material; do you wish to correct that statement?

A. It is a cent plus per foot in place, or a dollar plus per hundred feet in place.

Mr. Burr: Do you know at what point in the record that statement appears?

The Witness: 1188. That should be corrected. That should be 1.13 cents per foot in place for labor and material.

Mr. Burr: Let the record stand so corrected.
Commissioner Poor: It may be so corrected.

Q. Now, Mr. Kositzky, you don't know as a matter of fact whether or not in Ohio the Independents had not been using this wire previous to its recommendation by the American Company, do you?

A. I don't know.

Q. Do you know whether the Ohio Bell or the Bell Companies in Ohio had been using it before its recommendation by the American Company?

A. All Bell Companies I know did not start using it at the same time.

Q. What is it?

A. All Bell Companies did not start using it at the same time. There was not certainty in the minds of some [fol. 8974] companies whether they should use it or not.

Q. Please answer my question. That is not my question. You have been in Ohio for five years. Do you know whether or not the Bell Companies in Ohio used this kind of wire previous to its recommendation by the American Company?

A. I do not.

Q. Now, as a matter of fact, this development or improvement you are speaking about all the time is simply the placing on this kind of wire just the same as they would put insulation on other kinds of wire; isn't that right?

A. That is one of the things, yes.

Q. What kind of wire was it substituted for?

A. Mostly the No. 14 copper, pure copper, and in some instances what we call a single conductor K. K. wire; and in other cases there was a No. 12 copper.

Q. Did you make this appraisal of the Ohio Bell or the Ohio State exchange in Dayton, Mr. Kositzky?

A. No, sir.

Q. Have you ever seen it?

A. Yes.

Q. Did you ever check it?

A. Not in detail.

Q. Well, I will show you this Dayton State Exchange appraisal, page 50, as to whether or not there does not appear on that page, No. 14 B. & S. guage twisted pair copper, mile, $135.97; does that mean per mile unit cost?

A. Yes, sir.

Q. That is the per mile cost of that kind of wire then, is that correct?

A. Yes, sir.

[fol. 8975] Q. And No. 17——

A. Wait a minute.

Q. And No. 17 Brown & Sharpe or B. & S. guage twisted copper is $98.19 per mile?

A. Yes, sir.

Q. Now these are the two items that you compare in pricing your exhibit, are they not?

A. Yes, sir.

Q. And the difference between the two in this appraisal is —I am going to let somebody do the mathematics—$37.77; is that correct?

A. Per mile?

Mr. Burr: What is that amount?

Mr. Shuler: $37.77 plus; that is right, isn't it?

The Witness: I did not divide it out.

Q. Do you want to check me on it?

A. I will take your word for it.

Q. I wish Mr. Rhodes had.

Mr. Burr: You would have had a better record if he had.

Q. How much is that per hundred feet?

A. I will have to figure it out. About 70 cents in round numbers.

Q. I got it 71. That is all right. Now, Mr. Kositzky, how do you account for the difference between $1.13 a hundred feet, as stated in your direct examination, and 70 cents, as stated by you now?

A. They are entirely different price levels. Mr. Williams used a five year average, a five year mean, while I used current cost.

Q. You used what?

A. Current cost.

Q. That is, you used today's cost?

A. And then those figures of Mr. Williams you notice all overheads are in another part of the inventory al- [fol. 8976] together and I have this cost with the indirect as well as the direct costs.

Q. You have added overheads in your cost?

A. Yes.

Q. How much?

A. I haven't the details here.

Q. What per cent, 21 or 22 per cent?

A. Say 20 per cent. The price levels are about 25 per cent different so that accounts for the difference.

Q. Now what would be the difference in the price levels, do you know?

A. About 25 per cent.

Q. When were these cables or wires put into service by the Companies?

A. I do not know.

Q. Do you think it is fair to show the saving at the present high prices if it was put in in the past at low prices?

A. I think so.

Q. You do?

A. It shows the savings today.

Q. Then if ten years from now prices should be 100 per cent higher the company would have saved 100 per cent more, if you were figuring it in a similar case?

A. Whatever the plant would be at that time, yes.

Q. And if in ten years from now the prices would be less, I suppose you would use the figures existing at the time the cable or wire was put into the plant?

A. Yes, sir, we would have to be consistent.

Q. Now, Mr. Kositzky, in all your savings you have used present-day prices in your estimates?

A. Yes, sir, that is right.

[fol. 8977] Q. Now, Mr. Kositzky, you say you have added about 20 per cent for overheads. What per cent of that 20 per cent would represent engineering?

A. Five.

Q. Whatever engineering was done in putting in the other kind of wire would be the same engineering that would be used in putting in the wire you are speaking of; isn't that right?

A. No, our engineering runs five per cent on the expenditures of the plant.

Q. Mr. Kositzky, if you will answer my questions we can——

Mr. Burr: He did answer it.

Mr. Shuler: No, he did not. I asked an entirely different question.

(Question read.)

Q. My question simply means this; you substituted a wire for another wire; is that correct?

A. That is right.

Q. Now the engineering on the first one would be no different from the engineering on the other?

A. Strictly theoretically, no, but practically it would be.

Q. Why?

A. Because our engineering is a certain amount of our total expenditures.

Q. You mean that is what you estimate——

A. If the expenditures are more, the engineering is merely a percentage of the expenditures.

Q. In your appraisals do you estimate your engineering expenses at what they were in the actual construction of the plant?

A. No, sir.

[fol. 8978] Q. Nor have you done that in making an estimate of these savings?

A. No, sir. We take the experiences—recent experiences,——

Q. No, just answer my question. Is it a fact, Mr. Kositzky, that this kind of wire is put into plant as it is actually used and usually in short lengths?

A. Generally, yes.

Q. Then where is the engineering expense connected with that of five per cent?

A. That gets its accustomed loading of overheads; that is strictly according to our accounting rules as prescribed by The Interstate Commerce Commission.

Q. That is true; it is merely a loading.

A. It is a cost. It is an allocation of costs.

Q. You used the word "loading".

A. Loading and overheads are the same.

Q. Now you have added an expense of taxes during construction in your savings, have you not?

A. That is right.

Q. Do you know that as a matter of fact there were any taxes added during construction?

A. You are talking about the original cost?

Q. The substitution.

A. In reproduction there would be, yes.

Q. In reproduction there would be, yes, but you are not giving us an appraisal. You are trying to show us what is saved by the Associated Companies in this substitution?

A. If this property were reproduced today, under the con-
[fol. 8979] ditions under which it would have to be built if these savings and developments were not available.

Q. Would there be any appreciable interest during construction because of the change in the wire?

A. Certainly, greater capital expenditure, more money involved.

Q. Now, Mr. Kositzky, as a matter of fact, can you imagine that the engineering of copper wire actually costs more than the engineering of copper steel wire?

A. I think I have answered that question.

Q. Then you answer that there is a difference?

A. Engineering is a matter of value——

Q. Now wait a minute; just answer my question. What is the difference in engineering in placing copper wire and engineering placing copper steel wire?

A. Just as I answered, theoretically there is no difference, but practically there is a difference, and on the books—on the way it is charged on the books.

Q. Well, now, let us put the question this way. What do you mean when you speak of engineering in regard to the placing of this wire?

A. I can only answer that this way, Mr. Shuler, that we have a certain engineering bill of expense in the State of Ohio, or in connection with the engineering of any property. That engineering is limited to the various items that go into that property, wire, as well as conduit, buildings, cable and everything else. As to engineering on any particular item, I cannot answer that.

Q. Now, Mr. Crunden distinguished between the engineer
[fol. 8980] and the accountant in these matters of depreciation, etc. Are you speaking now as an accountant or as an engineer?

A. I was trying to tell you how the engineering expense is spread to the various items that go into the plant.

Q. Then you are speaking as an engineer?

A. That is the way the engineering expenses are distributed.

Q. Now, listen, Mr. Kositzky; you have tried to show a saving in the use of this wire that the company made, have you not?

A. Yes.

Q. And you are not appraising the property for a rate basis?

A. I am trying to show the savings, Mr. Shuler, if you had to reproduce this plant, with the kind of plant that we were using prior to the development of these things that we have said were made by the A. T. & T. Company, the property as it stands today.

Q. Right.

Mr. McConnaughy: May I ask a question then?

Mr. Shuler: Yes.

Mr. McConnaughy: Mr. Kositzky, you have explained the difference of price between you and Mr. Williams on the basis of the fact that Mr. Williams used a five year average and you have used present-day prices?

The Witness: Yes, sir.

Mr. McConnaughy: Which is 25 per cent more?

The Witness: Approximately, yes.

Mr. McConnaughy: If you added 25 per cent more to the cost of the 14 wire, that is 25 per cent of the $98.19, that [fol. 8981] would be $122.747, if my mathematics are correct?

The Witness: Yes, sir.

Mr. McConnaughy: If you add likewise 25 per cent to the cost of the 17 wire as shown in the Williams exhibit that would be $33.992 increase, making the cost of the 17 wire $169.963 per mile?

The Witness: I think that is alright.

Mr. McConnaughy: Now that difference would be $47.216 instead of the $37.773; isn't that correct?

The Witness: That is probably right; I don't know.

Mr. McConnaughy: So that the 25 per cent increase or the difference in the cost basis would not account for the difference between the 70 cents and the $1.13 that you spoke of?

The Witness: Probably not. I am not responsible for Mr. Williams' units. Those are my own that I am giving now. There may be a difference of opinion as to his units.

Mr. McConnaughy: Where did you get your units?

The Witness: From my own information.

Mr. McConnaughy: Did you get it from the experience of the Company, as did Mr. Williams?

The Witness: His experience I think is primarily an experience for a period of years, I think 15-19, or thereabouts, and mine, as I am able to determine it, current costs.

Mr. McConnaughy: You got your information, however, from the records of the Company, as he did?

[fol. 8982] The Witness: Not necessarily; it is a matter of judgment. Costs are not necessarily reflected entirely by the experience—the records of the Company. It is a matter of judgment as well as experience.

Mr. McConnaughy: Will you put into the record exactly how you did arrive at these costs and this difference in price?

The Witness: You want me to justify Mr. Williams' figures?

Mr. McConnaughy: Justify your own figures.

Mr. Shuler: The data as to how you arrived at your own figures.

The Witness: I took the material as it is billed to the Telephone Company, as I say, at the first of the year—that is about when these figures were compared; to that I added the supply expense, the freight; the supply is the warehousing, freight, etc.; and arrived at a material price f. o. b. Ohio.

Mr. McConnaughy: You said $1.13 in place.

The Witness: That is material. The next is the labor of stringing the wire. You have either short lengths or long lengths. This is mostly in drop wire. You have the cost of the labor plus the direct cost, all direct expenses. That is the labor item. And there is the cost of the incidentals, such as the trucking, the trucking in connection with the gangs that are placing the wire, and that, reduced to a common unit, such as per foot, is the manner in which I arrived at these figures. I think it is 4½ cents for the 14 [fol. 8983] and three and a fraction for the No. 17.

Q. Mr. Kositzky, following up just one question, you certainly have the data somewhere giving you that result?

A. Yes, sir.

Q. Can you give it to us for the record later on—not now?

Mr. McConnaughy: No, get it now.

Mr. Shuler: Do you want it now?

Mr. McConnaughy: Yes, sir; what is the use of putting it off? He has got it.

Q. Alright, give it to us.

A. I haven't all of the details here. Suppose I give you those later?

Q. What is it, Mr. Kositzky?

A. I haven't all of the details here. I will have to give you that a little later.

Q. How much can you give us, Mr. Kositzky, now?

A. I just have the amount of wire.

Q. Give us what you have and then you can give us the balance later.

A. The No. 14 copper was 4.45 cents per foot; 17 copper clad 3.32 cents per foot; and there is a total in exchange plant of 106,858,458 feet of this 17 copper clad wire, and the difference is $1.13 per foot. Multiply that by the total number of feet, gives a saving of $1,208,670.00 in first cost; and annual charges applied against that of 31 per cent, made up of interest——

Q. How much per cent?

A. 31 per cent.

Q. What is the interest per cent?

A. Interest at 8; taxes 2; administration 1; depreciation [fol. 8984] 15; maintenance 5; gives a total of 31; and that applied to the first cost difference would be an annual saving in annual charges of $374,688.00.

Q. That is all of the details you have?

A. Yes.

Q. You have no details of the 4.45 and the 3.32?

A. No, sir.

Q. You will get those?

A. I can give you those, yes, sir.

Q. Now, Mr. Kositzky, if you are to estimate these savings on the basis that the Ohio State did get that wire without the A. T. & T., and assume that the Bell Companies could have gotten it likewise, then the whole item of saving would be cut out, would it not? Do you understand the question?

A. I think I do. In other words, if the A. T. & T. had not developed this wire and took no responsibility for the wire, there would not have been that saving?

Q. Well, answer it that way now.

A. I suppose not.

Q. Now, Mr. Rhodes and others I think have testified that this wire was available to the Independents as well as to the Associated Companies, and I asked you, that being true, then the item of savings should likewise be cut out?

A. I do not think so. It is not a patented article, and it is something that any one could copy, and if Roebling and Standard and these other cable and wire manufacturers

copied the product developed by the A. T. & T. and the Western Electric Company, I do not know why that should [fol. 8985] minimize the value of this work to the telephone industry.

Q. Supposing, on the other hand, that the Roebling or the Standard Underground put it out first?

A. In its present form, 17 C. C.?

Q. When was that put out?

A. I said since 1905.

Q. Since 1905?

A. Yes.

(Question read.)

Mr. Shuler: Strike out "put it out first", and put in "17".

The Witness: Copper clad?

Mr. Shuler: Why, yes.

The Witness: Well, they did not. It first came to us from The Western Electric Company and the A. T. & T.

Q. Do you know whether it went to Independents before it came to you?

A. Not the Independents that were operating in the field that I was working in.

Q. Now answer my question as I have put it. If it is not the truth, that is one thing. It does not hurt you. If it is the truth, it does hurt you.

A. That is right.

Mr. Shuler: Now put my question and you answer it.

(Question read as amended.)

Q. And it was available to Independents, then should not this item of saving be eliminated?

A. If the Roebling people developed it, still the development may be credited to the Western Electric Company.

Mr. Shuler: Might I not have a yes or no answer to that question? I think it is a perfectly proper question.

[fol. 8986] Commissioner Poor: I do not think the answer has been responsive to the question that has been asked.

Mr. Burr: Why, the question has been added to and taken away from until I don't believe anybody knows what the question is. Even the last time the question was put an addition was made.

Mr. Shuler: Will the stenographer read it?

(Question read as amended.)

The Witness: If you will say "Put out and developed", I will answer that yes.

Mr. McConnaughy: No.

Mr. Kinnison: I object to that. Strike out the word "development".

Q. I want a yes or no answer to my question.

A. No, if you want it that way; I will give you the answer no.

Q. Now, Mr. Kositzky, what is this development that you are speaking about that the American Company made?

Mr. Gentsch: He said he did not know.

Q. Can you answer that question, Mr. Kositzky?

A. It is the application of the coppered steel wire to the distribution use. That is, pairing it and insulating it the same as the No. 14 copper wire was formerly treated and used.

Q. In other words, it was applying to this copper wire the same treatment that had formerly been applied to another wire?

A. That is right, with instruments and so on, to make certain it would stand up and be serviceable.

[fol. 8987] Q. What was done by the American Company to make it stand up and be serviceable?

A. Subjected to laboratory tests.

Q. What kind of laboratory tests? What kind of laboratory tests was this subjected to?

A. I haven't seen the actual testing but I have seen the laboratories and I know about what the tests are; merely a bending test to see if the insulation would have the same resisting powers; also to see if the wire, which is of a little smaller diameter, would cut through the insulation. This type of wires is usually tied around knobs where it attaches to poles and buildings—to see whether it would tie or not without breaking, and a number of tests of that character.

Q. What things were subjected to these tests?

A. What do you mean by "what things"?

Q. You say it was subjected to certain tests and I want to know what was subjected to the tests?

A. We have an abrasion test.

Q. What was subjected to that?

A. This wire, this insulated wire.

Q. Well, go on. What other tests and what things were subjected to them, can you tell us?

A. That is about all I know about the wire.

Mr. Kinnison: Mr. Kositzky, those tests you speak of do not constitute a development, do they?

The Witness: No, sir, it don't cost us to develop that——

Mr. Kinnison: No, I say do not constitute a development?

[fol. 8988] The Witness: I think so. That is part of the determination of whether or not a wire of that character can be used for this purpose.

Mr. Kinnison: It did not add to the properties of the wire or in any way develop any process of application; you just tested it to see whether it was presently available or not, didn't you?

The Witness: Just tested to see whether the wire would be suitable for this purpose.

Mr. Kinnison: You did not develop it?

The Witness: We did not develop it. It was done by the A. T. & T. and Western Electric Company.

Mr. Kinnison: I mean to say, those tests in themselves do not constitute a development of the wire?

The Witness: Technically, perhaps not, but it all has to do with the application of the proper kind of wire of that type to this purpose.

Mr. Kinnison: Actually what you were trying to see was whether or not it was desirable and you did not have to add to it to make it available?

The Witness: I don't know the details. It was years ago and I cannot answer as to those details.

Q. Now, Mr. Kositzky, you testified, or you took into account a 15 per cent depreciation on this twisted pair copper steel wire, did you not?

A. Yes.

Q. What did you mean by that?

A. That this wire has a shorter life; it only lasts a very short period.

[fol. 8989] Q. How much?

A. I don't know exactly; probably seven or eight years.

Q. You don't know exactly? Then why did you take 15 per cent?

A. Because that is the result of our studies as testified to by Mr. Schneider.

Q. Now, Mr. Kositzky, what is it that shortens its life to seven or eight years?

A. Why, various things. The weather-proofed wire does not stand up as long and the wires being in contact with only the insulation as a separation it breaks down the insulation. In many instances they go through trees and the abrasion from trees has its effect.

Q. Mr. Kositzky, didn't you ever read your circular on How to Prune Trees?

A. Would you want some one to prune the trees in your yard?

Q. This is a weather-proofed wire that you are talking about?

A. Yes. A telephone has a very short life in one particular location; they are moved rapidly, and the wire of course is not in one locality on the average very long on account of its removal because of these changes.

Q. But, Mr. Kositzky, you often leave the wire on for some period afterwards on the theory that some one else will move into the house?

A. That is right. All those things taken into consideration gives us a depreciation of 15 per cent for this particular wire.

Q. Just the things you have mentioned?

A. Yes, sir.

Q. Now if this wire is exposed to the weather for seven years, in your opinion then it is useless?

[fol. 8990] A. I did not say that. A particular wire otherwise well protected, that is from abrasion and so on, and allowed to remain in one place, may remain 12 to 15 years. I am speaking of averages.

Q. Your thought is that all your wires, taking into consideration that a certain percentage of them sufficiently large, are within trees not pruned according to your instructions from the American Company and other places where abrasion occurs, is that right?

A. That is right.

Mr. Burr: Read that question.

(Question read.)

Mr. Burr: There isn't any question there at all.

Mr. Shuler: Then I will make a question.

Mr. Kinnison: The witness seemed to understand. He did not get the shake of the head that time.

Q. What percentage of these wires in a plant are located where abrasion shortens their lives?

A. I don't know.

Q. Then how can you use that as a factor to determine its shortened life due to abrasion?

A. We know it happens. We know that wire strung to be perfectly clear of foliage, the foliage will grow into the wires. We haven't a battery of men out watching these trees and pruning trees. It would cost us more than it would to replace the wires when the damage does occur.

Q. Now supposing the insulation is worn off by abrasion through a tree, how much wire do you take down and replace?

A. The entire drop from the pole to the house.

[fol. 8991] Q. From the pole to the house?

A. Yes, sir.

Q. Is all of the wire of which you have spoken drop wire?

A. I should say about 90 per cent of it.

Q. That is 90 per cent of all the wire you have calculated upon to show your saving is between the pole and the house?

A. No, drop wire from the terminal to the house.

Q. Where is the terminal?

A. It may be on the pole nearest the house, or it may be one or two poles from the house.

Q. It does go from the pole to the house?

A. Yes, and from pole to pole.

Q. Yes, that is true. From pole to pole do you get much abrasion?

A. Oh, yes, trees between poles, yes.

Q. When the wire is exposed to the weather you think it will last for 15 years?

A. Weather only?

Q. Yes, weather only?

A. I don't know. I said about 12 or 15 years.

Q. And the reduction to seven year life is due to the loss from abrasion?

A. Storms, removals, because of subscribers' wishes or our own, changes in the plant wiring, and so on; dozens of reasons.

Q. But the property is not lost when you take it down from one house, is it, to another?

A. Yes, sir.

Q. Don't you use it another place?

A. That is the period I am talking about, left in one location.

Q. But not the actual service life of the wire?

A. You are talking of the wire? No, this is the material [fol. 8992] in place.

Q. You are talking about 15 per cent for depreciation because wire, according to your experience, lasts in one location on the average seven years?

A. That is about right.

Q. Now have you got the details of your Exhibits 31 and 32.

A. What are those, please?

Q. Estimated savings for The Ohio Bell Telephone Company due to certain items of development work carried out by the General Engineering Staff of The American Telephone Company,—31; 32, Estimated Saving for The Ohio Bell Telephone Company due to certain items of development work carried out by the General Engineering Staff of the American Telephone Company.

A. Yes, sir.

Q. Will you give us those? Take 31, Line 1?

A. Lead antimony sheath cable—31 or 2?

Q. 31.

A. That is fine wire cables, excepting 900 pair 22-guage and all sizes of 24 guage cable including ducts.

Q. Give us the details of that?

A. That is divided into four items, the aerial cable, underground cable, submarine cable and saving due to ducts.

Q. Yes. Now the details of it?

A. Now there are 13,129,288 feet of aerial cable. Savings per foot of 22-guage over the cost of 19-guage is 22 cents.

Q. Now that is at present-day prices?

A. That is right.

Q. Right.

A. That gives a current cost saving in first cost of aerial [fol. 8993] cable of $2,929,869.00

Q. What was that price you used?

A. Current cost prices.

Q. I know, but what was it?

A. You mean the details? Well, now, there are a dozen or more sizes of cable and lengths, is that the detail you want?

Q. Yes.

A. Well, I haven't all that with me. I have just reduced it here to broad units and the general units.

Q. You haven't the details at all anywhere?

A. Yes, we have got the details from which all of these were developed, yes.

Q. That is what I mean.

A. I haven't them.

Q. Where are they?

A. Cleveland.

Q. When could you get them for us, Mr. Kositzky?

(No reply.)

Q. Well, give us what you have, Mr. Kositzky.

A. The annual charges of aerial cable is 20 per cent, made up of 8 per cent interest, 2 per cent taxes, 1 per cent administration, 5½ per cent depreciation, 3½ per cent maintenance, making 20 per cent. That gives a saving in annual charges of $585,974.00.

In underground cable there are 4,143,047 feet, and the saving in underground cable is, of 22 over 19, 82 cents per foot of cable. That gives a current cost saving of $3,395,-366.00, and the annual charge applied to that is 15.68 per cent, made up of, interest 8 per cent, taxes 2, administration 1, depreciation 3.38, that is the composite, taking [fol. 8994] the main and subsidiary, and maintenance 1.3. That gives the saving in annual charges of $532,393.00.

Then there is a small amount of submarine cable, only 819 feet; a current cost saving of $1298.00; annual charges $337.00.

Where the cables of 22-guage are larger than 300 pair, 300 pair being the maximum size of 19-guage cable, it would require two cables, and where these are underground cables require addition- conduit, and there are 3,300,928 duct feet of additional conduit that would be required.

Mr. McConnaughy: Why is that additional conduit required? I don't get it.

The Witness: In this way, Mr. McConnaughy. A 600-pair 22-guage cable, if it were only 19-guage, would require two

cables, because the 19-guage cable of maximum size is 300 pair.

Mr. McConnaughy: That is the cable itself would be larger?

The Witness: It would be larger than the capacity of the duct, so that it would require two ducts. In the State of Ohio, for every occupied duct there are about two ducts, emergency ducts, a duct required for the city and then for growth, and a conduit plant is but 50 per cent in use. For this cable there would be about two additional ducts. For the conduit then the first cost would be $3,088,255.00, and the annual charges applied to that of 14.1 per cent, interest 8, taxes 2, administration 1, depreciation—that is composite for the main and subsidiary—2.6, and maintenance only a [fol. 8995] half of one per cent, a total of 14.1 per cent, which would give a saving in annual charges of $435,444.00; or give a total first cost saving of $9,414,788.00 and an annual charge savings of $1,554,148.00.

Q. Now, Mr. Kositzky, on that point, does that total amount you have given us of wire mean only the amount of that kind of wire that you have calculated?

A. Yes, sir, of cables, excluding the 900 pair and all sizes of 24-gauge. This is merely 22-gauge up to 900 pair.

Q. It does not include any 19-guage steel in use by the Company?

A. Oh, no.

Q. Does not insulate any of that?

A. No.

Mr. McConnaughy: What are your quantities? Is it the total amount in place or the amount that has been put in place since these changes were effected?

The Witness: That is the total amount in place today.

Mr. McConnaughy: Oh, my goodness, that is not the basis. You mean if this plant had been constructed according to these new methods, it would cost this much less, the whole plant?

The Witness: Let me make myself clear. If the 22-guage wire had not been developed, to get the same equivalent of wire in cables and conduit we would have to have an investment greater by $9,414,000.00, than we have today on current cost prices.

Mr. McConnaughy: You have not saved this amount then;

this is purely a theoretical saving? That plant would have [fol. 8996] cost this much if you had used——

The Witness: It would have cost this much more if we had not used this kind of equipment.

Mr. McConnaughy: In your entire plant?

The Witness: Yes, sir.

Mr. McConnaughy: Why, that is funny.

Q. Have you got any more detail on that?

A. That is all.

Q. How about Line 2?

A. That is the 900-pair 22-guage and all sizes of 24-guage cable. In other words, if the 900-pair 22-guage cable had not been developed or the 24-guage wire in cable had not been developed, and using, say, the 22-guage cables commonly used up to this time instead, it would have involved an additional investment today of this $1,323,699.00.

Q. That is a saving not as against the 19 wire but as against the 22-guage?

A. That is right.

Q. Now have you got the details?

A. There are 393,127 feet of aerial cable of the 24-guage type and the difference between the 24 and the 22-guage wire in cable is 13 cents per foot. That, applied to this amount——

Q. Just a minute. Again, are both of those priced at present-day prices?

A. That is right.

Q. But you have not the prices you have used?

A. Not in detail.

Q. You have them somewhere, haven't you?

A. Yes.

Q. Will you get those?

A. If you want them.

Q. Go ahead.

A. That would be 13 cents per foot applied against this [fol. 8997] quantity, $52,532.00 first cost; apply to that an annual charge of 20 per cent—being the same as the other item—$10,506.00. There are 780,149 feet of 900-pair 22, or 1200-pair 24-guage cable.

Q. Mr. Kositzky, another question right along there. All your estimates of savings are based on reproduction new at present-day prices?

A. That is right.

Q. Not based on the way the wires were actually placed into the plant by the company?

A. No, that is a condition as of today that I am giving.

Q. Now if it were based at the time and in the way they were actually placed by the company it would not be so much, would it?

A. No.

Q. Because you would not have overhead expenses as you do in a cost new?

A. You would still have overheads.

Q. Yes, but the engineering and all of that would have been done by the company's force which they had and were paying for, is that right?

A. The same as it is done today. I do not see any difference.

Q. All right; go ahead.

A. The difference of cable, of the underground cable, between the 900 22-guage and the 24-guage over 22-guage is 68 cents per foot. This, applied to the 780,000 plus feet, gives a first cost item of $535,900.00; and the annual charges of 15.68 per cent applied to that, being made up the same as in the former item, was $84,029.00.

Again, in the underground, there is a duct saving as a 1200-pair requires but one duct, and the 600-pair would [fol. 8998] require two ducts. and the same way with the 900-pair. And I assume that two 900-pair cables now requiring two ducts, if in 600-pair would require three ducts, and allowing again for the surplus ducts there would be a duct saving of 785,903 duct feet, or a current cost saving of $735,269.00; and annual charges applied against that of 14.1 per cent would give an annual cost saving of $103,673.00; or a total first cost saving of $1,323,699.00 and an annual cost saving of $198,208.00.

Q. You said, I believe, in answer to a question a while ago, that these savings were based on reproduction new at present-day prices?

A. Yes, sir.

Q. But that you have not with you the prices that you used?

A. All of the details, no.

Q. Line 3?

A. Line 3 is the introduction of lead antimony cable sheath in place of what was formerly lead tin alloy. And

I want to make a correction in the record. I believe I gave the figures incorrectly to the stenographer or they were—at least they are not right in the record as to the metal prices. It does not change the answer, however. The record shows antimony at 8¼ cents a pound; it should be 10½.

Q. At what page?

A. Page 1187. It shows lead at 10½ and it should be 8¼. In other words those two metal prices are just reversed. The tin price is alright. And the difference shown in the record on Page 1187 of $1.29¾ should be $1.32.

Mr. Burr: May I interrupt you one minute? I think Mr. [fol. 8999] McConnaugh-y has an idea that your savings are calculated on the basis of substituting for all cable in the plant the 22-gauge cable; is that correct?

The Witness: Not all cable, no. Just that cable which is now 900-pair 22-guage and 24-guage, substituting 22-guage cable for that.

Mr. Burr: In other words, you are only figuring the savings on part of the plant, that is the smaller guage wire?

The Witness: Yes, that is right. It is practically the same as Mr. Rhodes testified to for the United States as a whole. There is no difference only I applied it to just the State of Ohio.

Mr. McConnaghey: Mr. Rhodes used the purchase of new material since these different changes were put in effect. Now I understand that you have taken the plant in all of these different departments as it exists today and have refigured the thing as if it were constructed with these improvements?

The Witness: I am not sure what costs Mr. Rhodes applied, whether current or original costs.

Mr. McConnaughey: It is not a question of costs but a question of quantities that I am concerned about. What are the quantities of these different materials that you have used?

The Witness: It would be the same as the purchases only we get this from our inventories. In other words, the 22-gauge cable that is now in the plant under the sizes I have [fol. 9000] mentioned, of 900-pair and 24, and substituting for that a 19-guage wire cable, would increase our investment by this amount and the carrying charges by the amount I have stated.

Mr. McConnaughey: Alright.

The Witness: Now there are of the lead antimony alloy sheath cable in the State of Ohio 6,157,655 feet of aerial cable, 3,417,578 feet of underground cable, and the pounds of sheath computed from knowing the weights and the sizes is 7,486,278 pounds for the aerial, 13,051,562 pounds for the underground, or a total of 20,537,840 pounds. Now where there was formerly used three pounds of tin and 97 pounds of lead, that is to every 100 pounds of sheath, there is now used one pound of antimony and nine pounds of lead. In other words, three pounds of tin were replaced in the antimony sheath by two pounds of lead, and one pound of antimony. The tin costs 53 cents a pound, or, for the three pounds, $1.59.

Q. As of what date?

A. Current costs as about the first of the year. And the two pounds of lead and the one pound of antimony which now take the place of three pounds of tin at 8¼ cents is 16½ cents, and one pound of antimony at 10½, or a total of 27 cents. In other words, the alloy now costs 27 cents for the three pounds which replaced the $1.59 worth of tin, or a saving of $1.32 per hundred pounds of sheath; applied against 20,000,000 pounds gives a saving of $271,100.00.

And thereupon a recess was had until 1:30 o'clock P. M. of same day, Wednesday, April 23, 1924.

[fol. 9001] Wednesday Afternoon

April 23rd, 1924.

And also G. A. Kositzky, resuming the stand for further cross-examination, continued his testimony as follows:

Cross-examined by Mr. Shuler:

Q. We had finished the data on the matter we were discussing at the recess I think. Do you know whether or not they actually paid more for cable previous to the introduction of antimony or less?

A. Yes, it effected a saving of about—A deduction was about five to seven per cent.

Q. In the selling price?

A. Yes, sir.

Q. You were through with your data on the lead-antimony, were you not?

A. Yes, but I was not sure whether I had quite made one point clear as applicable to items 1, 2 and 3. That is, the savings as I have computed them are only on that plant to which they apply and not on the total plant.

Q. What do you mean by that?

A. That is, I only computed savings of antimony sheath to the cable that is now antimony sheath and not to the total plant. There is some tin cable still in the plant. That, of course, I have excluded. The same way with the savings of fine wire cable. That is only that plant that is in the [fol. 9002] plant that is now fine wire and not — that is not fine wire. That is only the plant to which these savings are applicable.

Q. I think I understood you to say that you used three per cent of tin in your calculations?

A. Three per cent tin, yes. That was the alloy used prior to the introduction of antimony.

Q. Do you know whether or not the Central Union and the Cleveland Telephone Companies actually did specify three per cent previously to the introduction of the antimony?

A. The cable is ordered under a certain specification and that specification says whether it is antimony tin alloy.

Q. Can't you answer my question yes or no.

Mr. Shuler: Read the question.

Question read.

Q. Three per cent tin?

A. I don't know.

Q. Mr. Kositzky, will you explain just briefly again how you arrived at your duct saving? I don't care for the detail. The method you used is what I want.

A. The method? All right. Take in Item 2 where we use now 900 pair and 400 pair cables. Prior to the introduction of these cables 600 pair was the largest size. Now a 1200 pair cable requires say one duct where formerly it was necessary to place two sixes; that would require two ducts. The 900 pair cable today take- one duct while formerly two 900 pairs would require three sixes, or three ducts instead of two. So that in that manner, I have computed the additional duct feet that would be necessary if 600's [fol. 9003] were in the plant today against the 9's and 12's that are there today.

Q. Can you actually build me two conduits side by side a certain length?

A. I don't just understand what you mean.

Q. Well, now, I want to get a concrete example. Suppose we would build a conduit a half a mile long. Just for the example take a cost per lineal foot for a four duct conduit. I don't care what you take for the example just so you use the same figures all the way through?

A. You don't care whether it is under-pavement or whether it is out in the parkings? That would make no difference? Do you want a manhole——

Q. The way you build them, the way you build them; I want to build them the same?

A. A four duct conduit a mile long, fifteen manholes—I think that is about what they might average—Under asphalt pavement, you want to know about what that would cost today?

Q. Yes?

A. With laterals to and from the manholes, which is also customary.

Q. I don't care for that particularly, do I Mr. Kositzky?

A. I don't know what your problem is.

Q. The problem is I want to see how you figure out the saving as between the four and the six duct conduit, that is all?

A. I can answer your question without going through with this formula then. Merely this, that the nine and twelve hundred pair cable require fewer ducts, so that there is that capacity of conduit saved that we have available because [fol. 9004] of the use of these larger cables, which would have this value.

Q. Which value?

A. The value I mentioned in Items 1 and 2 of the conduit savings. I have taken an isolated section. It might apply to a greater extent or a less extent.

Q. Mr. Kositzky, I just want to get an example of your prices is all. Let's say a conduit a mile long with four ducts cost a certain sum of money. I don't care what you make that cost?

A. Say $20,000.00.

Q. Now, what would a conduit, a six duct conduit, the same length, built the same way, cost?

A. Say $35,000.00.

Q. Now, if that is true, you contend you save $15,000.00 by this cable?

A. You can save $15,000.00 if the four duct conduit can be made to answer the purpose of the six.

Q. Precisely so; and that is the way your arrive at this saving, that the four duct conduit answers the purpose of six, because of the smaller wires in the cable?

A. No, I did not arrive at it exactly that way. Each duct has a certain value, and if you are able to postpone ducts you postpone construction, and this is the number of ducts that we have for future use by using the larger size cables.

Q. Mr. Kositzky, your estimates here before the Commission are based on present reproduction of plant; is that right?

A. Yes, sir, that is right.

Q. All I am asking you to do is to tell us what the dif-
[fol. 9005] ference would be at present day prices, building a four duct conduit and a six duct conduit?

A. I just gave it to you approximately.

Q. We will say it is approximately $15,000.00?

A. All right.

Q. What makes that difference of $15,000.00?

A. That is the difference in the sizes of those two.

Q. Maybe I can make myself clear this way. To dig a trench to put a four duct conduit in costs the same amount as to dig a trench to put a six duct conduit in except that perhaps the six duct conduit must be a few inches deeper?

A. That is about right, yes.

Q. That is right; now, if it cost $1.50 per lineal foot to build a duct or a conduit for four ducts, it would only cost a few cents more per lineal foot to dig it sufficiently deep to put in two more conduits?

A. If you build it that way, that is right, yes.

Q. And then the additional cost in building a six duct conduit over a four duct conduit is the difference between four inches or six inches of digging, and the purchase price of two more ducts, and the cost, labor cost, of laying the two more ducts; isn't that right?

A. That is true, if you do this in connection with a new job.

Q. That is what your figures are based on, reproducing the plant new today? Am I right?

A. It is taking the value of the ducts saved today. That is another thing altogether.

[fol. 9006] Q. Now, as I have stated it to you, the difference

in digging four or six inches deeper, the cost of two more ducts, and the placing of those two more ducts in the trench, is not $15,000.00 a mile, is it?

A. Not on that kind of a job, no.

Q. Now, what you have done in estimating your saving is this; you have built a four duct conduit one mile long and found out that the per duct foot cost is so much per lineal foot, is that right?

A. Substantially, yes.

Q. And you have likewise built a six duct conduit and figured the per lineal foot cost, haven't you?

A. No, I have not taken the sizes at all. I have merely taken the duct feet saved by placing the larger cables over a period——

Q. What are the prices you have used in figuring out the saving? Let me have those. I want your unit cost?

A. The duct foot average cost——

Q. The duct foot average cost today——

A. Taking all sizes under average conditions, pavement conditions such as we have, with the manholes, subsidiaries and so on, reduces to 94 cents per duct foot.

Q. Now, we are going to take a six duct conduit a mile long—No, let's take it a thousand feet—A hundred feet long—You then would have ninety-four dollars, wouldn't you?

A. 100 feet.

Q. What size?

A. That is one foot.

Q. That is one duct foot?

A. Of course, if you build one you can't build it for 94 [fol. 9007] cents. It would probably cost several dollars.

Q. What number if ducts did you want to take?

A. This is the average of all the conduits in the State of Ohio.

Q. That is what you have used in this case irrespective of the number of ducts in the conduits?

A. Yes, sir, that is the value of the ducts today in the Ohio Bell plant, 94 cents per duct foot.

Q. And that is the reproduction cost, present day prices; now let us take a four duct conduit 100 feet long, and what would it be?

A. That might run anything, $600.00 or $1000.00.

Q. Let me put it this way, Mr. Kositzky. My contention is this, that the saving made by a four duct conduit over a six

duct conduit is simply the difference of digging a trench in the case of the six duct conduit a few inches deeper?

A. If you want to take it that way, yes.

Q. And the cost of the two ducts in addition thereto, plus the cost of laying the extra two ducts. Now, if you base your savings on that method, would you arrive at the same amount of savings as you do by your method? Your method would give you a very substantially larger amount of savings would it not?

A. I don't know, it might be larger.

Q. It would be substantially larger, wouldn't it?

A. If you take a condition like you have mentioned, yes, it [fol. 9008] would be larger.

Q. What rate of annual depreciation do you use in connection with the Number 14 twisted pair wire, or copper?

A. I use the same rate——

Q. I didn't ask you that. I asked you what you used?

A. 15 per cent, the same as the number 17 CC.

Q. What is the respective junk values of the two?

A. The copper is higher.

Q. The copper wire junk value is higher than the other that you have substituted?

A. That is right.

Q. Is the difference in life service enough to compensate?

A. I worked on differences. I took the difference between the copper and the copper steel and then applied annual charges against that. I did not apply any against one and then on the other.

Question read.

Q. Answer that question yes or no, or if you cannot answer it say you cannot.

A. About the same, I should say. There wouldn't be a great deal of difference.

Q. Going on with the data in this Exhibit 31, will you give us what you have? It seems that some of the attorneys, Mr. Kositzky, do not yet understand your method of computing the savings in this duct.

Mr. Burr: That is not a question.

Mr. Shuler: He has answered all the other questions.

The Witness: Let's see if I can make it clear.

Mr. Burr: I suggest a question be asked.

[fol. 9009] Mr. Shuler: I asked him to explain his method of computing the savings in ducts by the use of 900 pair cable or the 1200 pair cable. Take either one. I don't care which one you take.

The Witness: Well, it doesn't make any difference. Let's take the 1200 pair. The 1200 pair 24 gauge cable will occupy one duct. Now, before the introduction of the 1200 pair——

Q. It took two sixes?

A. It took two sixes. So what we mean is this, that where you have one duct in use with the 1200, you would have under the conditions the two ducts, and each duct has a certain use value, and in this particular case it is 94 cents per duct foot. That is the use value of the plant. And with every occupied duct—The conduit is about 50 per cent in use. It is not quite 50, but I have used 50 per cent, the spare duct being for growth, for city's use, such as fire and police cable, and it is good policy to have an emergency duct for maintenance purposes. And then there is always a certain number of, you might say filler-in ducts, when you build a six duct instead of five or a nine instead of eight, that is, economical sizes, so that there are always in a system a number of idle ducts. And that runs about two ducts in a system to one in use. So for every duct that we were able to save by use of this 1200 pair cable, we had one less duct in use, or the value would be equivalent of two ducts—duct feet.

Q. Yes, but you mean if you save two ducts, you save [fol. 9010] two times ninety-four cents.

A. Yes, sir.

Q. Or $1.88?

A. Yes.

Q. Per foot; is that right?

A. Yes, sir.

Q. And in a thousand foot conduit you would save $1,880.00; right?

A. If you had a 1200 pair cable a thousand feet long in that conduit, yes.

Q. But now the cost of putting in one more duct or two more ducts when you are building a conduit, making sufficient space for two more ducts and placing two more ducts, would not amount to that much would it?

A. No, but we don't build the conduit——

Q. Wait a minute.

Mr. Burr: Let him finish his answer. Just a moment?

A. We don't build conduit at the time we order the cable. We would not build a six duct or we would not place two additional ducts; we would probably place 12 additional or some larger size. So I do not see how that example can be applicable at all, Mr. Shuler.

Q. Mr. Kositzky, the difference in the cost of two things is the difference between the cost of building them; isn't that right? The cost of digging a trench is so much, isn't it? Now, how deep a trench would it take to put in a four duct conduit?

A. That depends on the clearance required by the city over your conduits; usually about 25 or 30 inches.

Q. Mr. Kositzky, there are two companies wishing to build conduits out Clifton Boulevard in Cleveland. One is [fol. 9011] going on one side of the street and the other is going on the other side of the street. One is going to place four ducts in its conduit; the other one is going to place six ducts in its conduit. In every other respect they are going to be the same except for the one having six ducts and the other one four?

A. That is right. Now you want to know the difference.

Q. Precisely?

A. It would not be a great deal.

Q. It would be very, very small wouldn't it?

A. It would be the material in the ducts, the additional excavating and probably would be only 50 cents to a dollar per trench foot, but——

Q. Now, don't "but"?

A. Let me go ahead. Suppose this company built the four duct, of 600 pair cable and then required two more ducts; it might require additional trench then for the additional ducts; while if they would place 1200 pair cables the four duct conduit would give them twice the capacity.

Q. I am doing precisely what you have done, I think. I am building ducts or conduits, present day, present prices. That is what you have done on your method. But instead of finding out the actual difference in cost of doing that, you have devised another method which I contend is unfair, because it gives you a larger saving than the actual difference in the cost of construction of the two conduits?

A. I do not think your case is applicable at all, Mr. Shuler.

Q. I did not ask you that, because I am building this one. [fol. 9012] You have built yours and I am building mine. Now, you admit that if you found the difference in the cost of building conduits, four and six ducts sizes, my method, that the result would be very measurably smaller, whatever savings you have arrived at in your computation, do you?

A. The difference would be smaller, but the case would not be applicable.

Q. Will you for me, by tomorrow morning, give me the difference on a thousand feet on Clifton Boulevard as I have suggested between computing the saving my way and your way?

A. I can give you that right now, if you want it approximately.

Q. No, I don't want it approximately. Will you give it to me tomorrow morning?

A. All right.

Q. Now, take up the next item. You spoke of 94 cents as use value and also as reproduction cost. Do you mean the same in both cases?

A. Did I mention use value? That is the value of the ducts, average value, average cost of the ducts.

Q. You wish to strike out of your testimony anything about use value?

A. I did not know that I had made that statement.

Q. If you did, you want it cut out?

A. That is the cost, yes.

Mr. Burr: Is there any difference between the two?

The Witness: I don't know what value is.

Q. You want it cut out if it appears that you have used [fol. 9013] it? You want it cut out of your testimony?

Mr. Burr: No, he does not. He does not say that.

Q. What does he want us to understand by the 94 cents?

A. That is the average cost of the ducts in the system in Ohio—Reproduction cost.

Q. If you used the words "Use value" in the record, what do you mean by those words?

A. I don't know.

Mr. Burr: Do you maintain that there is such a term in the record?

Mr. Johnston: If you will allow me to speak I understood that he did use that term and we want it cut out or explained.

Mr. Burr: Does it occur in the direct examination.

Mr. Shuler: No, just recently.

Mr. Johnston: In the cross. I take it now that it is an inadvertent use and does not mean anything where it is.

Mr. Burr: I think we know now to what he refers when he speaks of the 94 cents.

Mr. Johnston: That is my understanding.

Q. What is your data on the copper-steel twisted pair wire?

A. I think we went into that in detail. You have that.

Q. What is that?

A. The copper-steel twisted pair wire, that is the first item we took up in the cross-examination.

Q. Well, the duplex cable?

A. There are 3,763,675 quad feet of underground duplex, [fol. 9014] 19 gauge conductors, a quad being two pairs, and there are 7,320 quad feet of submarine duplex, 16 gauge conductors. In non-duplex cable, there would be 50 per cent more wire. Reducing it to pair feet, it would be three times the quad feet, or 11,291,025 pair feet in the underground cable and 21,960 pair feet in the submarine. Now, the underground cable, using costs——

Q. What cost?

A. On a foot basis, since these are reduced to feet, would be .02151 cents per foot for the non-duplex, and .01326 for the duplex, or a difference of .00825 per foot saving. That is for the underground cable. And for the submarine cable, it is .14503 for the non-duplex and .1379 for the duplex, or a saving of the difference of .00774.

Q. Will you give us those figures again?

A. For the underground for the non-duplex it is .02151.

Q. The next one?

A. Duplex .01326.

Q. Now, the next one?

A. Submarine is .14503 and .13729. The savings would be the difference, in the case of the underground it would be .00825, in the submarine, .00774. Now that, applied against the quad feet, gives a current cost saving, first cost, underground cable, $31,064.00, and $57.00 in the submarine, or of $31,121.00. Now applying annual cost percentages to

this cost for the underground, using a percentage of 25.68, the same as was detailed before, $4,871.00, and in case of the submarine of 26 per cent, or $15.00, giving a total first cost [fol. 9015] saving of $31,121.00, and an annual saving of $4,886.00.

Mr. McConnaughey: Mr. Kositzky, why is it that the cost of the duplex is about 50 per cent more than the non-duplex? It is a little more than 50 per cent. Why is that?

The Witness: It cost a little bit more to manufacture the duplex cable than the non-duplex, because of the pairing up. So on the pair basis, it is slightly more.

Q. The next item now, loading?

A. This is the loading in the exchange plant and is applied to the inter-office trunks. And there are in the Ohio Bell 12,580 circuit miles of loaded inter-office trunks, as of the end of 1922. That is the figure that I had and used. These are 19 gauge loaded conductors. To get the same equivalent in transmission without the loading, without these loading coils, would have required a ten gauge conductor or a cable consisting of ten gauge conductors. The average size cable only contained 38 pairs, while the average size of 19 conductors is 200 pairs, so that we have 331 and a fraction miles of cable of the ten gauge, where now we have only 62.28 of the loaded conductor cable.

Q. Can you give us the supporting data on that?

A. Yes, what do you mean by the supporting data.

Q. I want to know where you arrive at the results you have?

A. So far I have given the data as I have gone along.

Q. But these miles you are talking about are located all [fol. 9016] over Ohio?

A. It is mostly in Cleveland. That is the only city where we have loaded inter-office trunk.

Q. That is what I thought?

A. And it is right there. It is the exchange loading. Now, under toll I have the figures.

Q. Did you ever install any ten gauge cable in Cleveland for this purpose?

A. No, sir.

Q. How long has it been since any was installed to your knowledge?

A. I don't know.

Q. Have you any idea when it was installed?

A. No.

Q. But you are computing a saving——

A. To get the equivalent, it would require a ten gauge conductor or the transmission equals of a ten gauge conductor, yes, sir.

Q. Go ahead?

A. Now, reducing this again to conductor feet, as we started out with conductor feet, 12,580 circuit miles I should say, of Number 10 cost $207.00 per circuit mile, and taking 82 per cent of that, because of the fact in this case, I have assumed if the fine wire cables had not been developed, we would have had coarser wire in the other part of the plant, so as to reduce the necessity of a hundred per cent loading down to 82 per cent, that would reduce this to $169.74 per circuit mile of the equivalent or the 19 gauge conductor is $39.00, so the savings in conductors is $130.07 per circuit mile.

Q. You say the cost; the cost as of what?

A. Reproduction cost.

Q. Oh?

A. Yes.

Mr. Burr: Continuing your answer——

[fol. 9017] The Witness: Now, the loading, to load the 19 guage wire costs $11.66 per mile. So I deduct that from the saving. That reduces the saving by the cost of this loading of $11.66. Then applying these costs to the circuit miles of loaded conductor, take 12,580 circuit miles times the $130.74, would be $1,644,709.00. Now deducting from that $11.60 for the price of loading would be $146,680.00. And there again you have got in one case a 200 pair cable and in the other case only a 38 pair cable. You would require 268.77 miles more of conduit, or rather more of cable. That reduced to duct feet would be 2,838,211 of duct feet of conduit required because of the larger amount of cable. And that, priced out, is $2,187,693.00, making a total saving in first cost of $3,685,722.00. Now, applying to these three items annual charges as detailed before, for instance, underground cable 15 per cent, the loading 16½ per cent and the conduit 13½ per cent, gives for the underground cable $246,706.00, a deduction for the loading of $24,202.00, because that is subtracted, plus the conduit of $295,339.00, or a total of $517,843.00.

Q. Give us Line 7.

A. Line 7 is a line I did not compute. I merely carried that in there as a total. It was testified to by another witness.

Q. You did not have that?

A. No.

Q. Who testified to that?

A. Mr. Anthony.

Q. Mr. Kositzky, you spoke on Page 1190 as to Item 9. How did you arrive at that?

[fol. 9018] A. The old tinsel cord, which we used prior to the introduction of the new tinsel cord, was 43 cents a cord. It had a life of four months, required repairing once a month. A new tinsel cord cost 69 cents per cord, had a life of two years, required repairs once in eight months. So that, computing the two on the basis of a two year life, taking the turnover and the repairs and all added together, gave in the case of the old tinsel cord a first cost of $2.58; in other words, we would have to have six cords in the two year period; they would have to be repaired to the extent of $2.40; and the old cord would cost in the two year period $4.98. The new cord lasting two years, we require but one cord in that period, 69 cents; repair once in eight months or three times in the two years, which would be 30 cents, or its total cost would be 99 cents. Over the two year period there would be a saving of $3.99, reduced to a one year period, would be half of that, or $1.99. And there are 125,581 of these new tinsel cords in the plant today, and the product of that $1.99 would be $249,906.00.

Q. Then I presume you want to change the record, 1190 where you say, "So that the saving in the cord in say a two year period, or the life of this new cord, is about $1.99." You do not want the record to show that the saving is $1.99 for the two years?

A. That is right, the life of the new tinsel cord.

Q. A saving of $1.99, for the two year period?

A. Yes—No, your pardon. That is a per year basis.

[fol. 9019] Q. The record though shows two years?

A. That is wrong. It should be $1.99 per year.

Q. Now, coming to Item 11, the cheaper contact metal?

A. Now, in that case—Do you want me to go ahead with that?

Q. Yes?

A. In that case, I did not have exact figures as to the metal that was used in Ohio. I did, however, obtain the amount of this metal that had been used in the Bell system, and I merely prorated that to Ohio.

Q. On what basis did you prorate it?

A. I took the period of six years, 1916 to 1921. Now, in the Bell system, while used in 1916—That is, the saving in the year 1916, $566,984.00, and the Ohio Bell ratio, taking stations of the Ohio Bell to the total, was 2.8 per cent. I took for that year 2.8 per cent of the total saving. Likewise, the year 1917, the saving was $1,746,936.00.

Q. How did you get that savings?

A. Those are figures that were furnished me.

Q. By whom?

A. Mr. Rhodes.

Q. Are they the same figures that he testified to here?

A. I am not sure. I asked him for these figures and this is what he gave me. In the year 1917 the ratio of the Ohio Bell to total was 2.7 per cent, which would make the Ohio Bell allocation $47,167.27. In 1918 the Bell saving was $2,266,232.00 and the Ohio Bell's allocation, taking 1.7 per cent, was $38,525.94.

Q. In 1919 the Bell system saving was $638,304.00. Tak- [fol. 9020] ing 2½ per cent as the Ohio Bell's proportion, $15,957.60.

In 1920 Bell system saving $3,104,904.00. Ohio Bell's proportion 2.6 per cent, $80,720.50.

In 1921 Bell system saving $5,143,368.00; the Ohio Bell's proportion was 3.8 per cent, $195,447.98.

I haven't any figures for 1922 or 1923, but the total for those years amounts to $393,701.84.

Mr. McConnaughey: What is that proportion of Ohio to the whole? Proportion of what to what?

The Witness: On the basis of stations, telephone stations.

Mr. McConnaughey: Stations in use or stations affected?

The Witness: No, telephone stations. That is the nearest method that I had of getting an allocation which might be proper for Ohio.

Mr. McConnaughey: Is that the total number of stations of Ohio?

The Witness: To the total in the Bell system.

Mr. McConnaughey: You mean to say that the total num-

ber of stations in Ohio is only that per cent of the total number in the system?

The Witness: Yes. Of course. In those years, you know, Mr. McConnaughey, the property of the C. & P. was not in Ohio. Strictly the Ohio Bell or what is now the Ohio Bell was a smaller proportion than it is today.

Mr. McConnaughey: Did you leave out Cleveland and [fol. 9021] Cincinnati?

The Witness: Left out Cincinnati, yes.

Mr. McConnaughey: And the C. & P.

The Witness: Yes, sir, and the Ohio State.

Q. Now, Mr. Kositzky, you say that this item——

A. It is only five per cent today with the Ohio State added.

Q. You say that the item of loading, Item 6 of Exhibit 31, three million some hundred thousand dollars, is only applicable to Cleveland?

A. Yes.

Q. Now, later on in your testimony you apportioned these savings over the various cities of Ohio according to property values didn't you?

A. Yes, that is what the savings would be.

Q. Therefore that apportionment is not very accurate is it?

A. No, sir, that is not it. This is merely a Cleveland saving. It is only allocated to Cleveland.

Q. But when you came to allocate all of the savings you added the savings on Exhibit 32 to the savings on Exhibit 31, found a sum of $29,936,600.00 and apportioned that to the various cities, did you not.

A. No, I did not. 32 was toll. That remains strictly in the toll property.

Q. What did you allocate to the cities?

A. I took just the items on page 31.

Q. On Exhibit 31?

A. On Exhibit 31, yes.

Q. You just allocated those?

A. Yes, sir.

Q. And that includes the item 6 that is applicable only to Cleveland?

A. Yes, and I am not sure just how I handled Cleveland. [fol. 9022] There may be an error in it.

Q. Then, if you did allocate all of 31 to the cities of the

state according to property located in those cities, it is not a proper allocation is it?

A. It is subject to correction by this amount.

Q. By that amount plus Item 8, prepayment coin box equipment?

A. No, we have those in all the larger cities in Ohio. I am not sure yet whether that loading has been allocated to the cities.

Q. It is not an accurate allocation?

A. I cannot answer that, because I say I am not sure whether the Cleveland loading was allocated to the cities or not. I would have to check that.

Mr. Burr: May I ask a question here?

Mr. Shuler: Yes.

Mr. Burr: If the savings shown under Item 6 had been computed for the exchanges in the State, other than Cleveland, would the total amount of the savings for that item have been greater or less than that given by you?

The Witness: It would be the same. That is the totals on Exhibit 31 would not change.

Mr. Burr: I am talking about Exhibit 31. I am talking about the Item 6 which if I understand you correctly, you say you have computed only for the City of Cleveland.

The Witness: That is right. It is applicable only to the City of Cleveland.

[fol. 9023] Mr. Burr: I see. That is all.

Q. In Exhibit 32, Item 5, open wire phantom circuits, have you included any poles there?

A. Yes, sir.

Q. Then give us the figures on that, will you?

A. There are in Ohio in the territory of the Ohio Bell Company's plant 18,765.18 miles of phantom circuit. If these phantom circuits were not in existence, to get the same amount, the same number of talking circuits or the same equivalent, it would be necessary of course to place that many miles of physical circuit of the same character. Such a circuit costs, reproduction, $146.00 per circuit mile, so applying $146.00 to the total miles phantom circuit, gives an item of $2,739,716.00 of additional copper wire necessary. Now without the phantom circuit of course we would not need the phantom transpositions or the phantom brackets, together with the phantom coils, and this deduction amounts

to $15.38 per mile of phantom circuit, and that, applied to the 18,765.18 miles would be a deduction of $288,608.00. For every dollar's worth of wire that we have in the plant, there is necessary for poles, cross-arms, guys, pins and all pole accessories, $1.88, chargeable to the pole plant or this type of plant, so that applying that ratio—the poles, by the way, would amount to $274.48 per mile, and that, applied to the total miles of phantom circuits amounts to $5,150,666.00, giving a total of $7,601,774. Applying annual charges to those items, to the wire 15.2 plus the circuit mile charge for maintenance, $529,028.00, and the phantoms a [fol. 9024] deduction of $43,868.00, and also the poles, annual charge of 18.8, $969,325.00, making a total saving in annual charges of $1,453,485.00.

Q. That again is reproducing the plant as it is at present day prices?

A. Yes, sir.

Mr. McConnaughey: That also assumes you would put up new poles for all these additional miles of wire doesn't it?

The Witness: Yes, it assumes we will have to have that much more investment in poles, cross-arms, pins, guys, glass and so forth.

Mr. McConnaughey: But you would not have to have that much additional poles would you? You would probably string these on existing poles?

The Witness: It would do this then, Mr. McConnaughey. If the pole had the capacity, deprive us of that capacity and we would have to make an investment to get that additional capacity, either now, to get the equivalent, or sooner than we otherwise would.

Mr. McConnaughey: If and when you did it.

The Witness: When we needed it.

Mr. McConnaughey: If and when.

The Witness: Yes, sir.

Q. Mr. Kositzky, do you know whether or not the Independent Telephone Companies have used 22 gauge cable generally?

A. When they started to use it?

Q. Yes?

A. No, I don't.

Q. Do you know whether the Independents bought all [fol. 9025] their 22 gauge cable from the Western Electric Company?

A. I don't believe they did.

Q. They bought it from other persons engaged in the manufacture of that type?

A. I think they bought it generally, some from the Western and some from others.

Q. Roebling?

A. I wouldn't wonder.

Q. Standard underground?

A. I think so, yes. They are cable manufacturers.

Q. Do you know how long other manufacturers like the Roebling and Standard Underground Cable have been making and marketing telephone and other cables?

A. No, I don't.

Q. The independents have used phantom circuits all along haven't they, Mr. Kositzky?

A. No, sir.

Q. Since when have they used them?

A. I know that the Ohio State Plant had but very few phantoms in it at the time we started operating that property, very few.

Q. Had but very few you say?

A. Yes.

Q. It had some, however?

A. Yes, we found a few.

Q. Do you know anything about the independent companies in other states, as to whether or not they have been using them?

A. To a very limited extent.

Q. With relation to this contact metal that you spoke about, do you know what was done by other manufacturers of telephone or electrical equipment at about the time that platinum became prohibitive?

A. I do not generally. I do know this, Mr. Shuler, that [fol. 9026] we have recently encountered some contact points on equipment manufactured by other manufacturers that was neither platinum nor palladium.

Mr. Burr: Other manufacturers than whom?

The Witness: Than the Western Electric, and it is very troublesome and is giving us a great deal of difficulty.

Q. Do you know whether or not the General Electric or the Westinghouse Company did anything in that regard in connection with their products?

A. I do not.

Q. Have you compared the cost of the American Company's new contact metal with the contact metal of the General Electric Company or any other actual maker of electrical contracts?

A. No, I have not.

Q. You simply made the comparison with the cost of the Western Electric, with the present day prices of platinum?

A. That is right, taking the figures as they were furnished me and trying to make a fair allocation to Ohio.

Q. If you would make a comparison with the General Electric prices for instance, do you know whether it would be lower or higher than the difference you have found in the way you have calculated it?

A. I don't know.

Q. You said Rhodes furnished you these figures on this contact metal?

A. The figures for the Bell system, and I allocated them.

Q. And the prices, too?

A. I used the prices that he gave me.

Q. That is what I thought you said. Wouldn't you say [fol. 9027] as a matter of fact that the advancing price of tin caused the use of antimony in cable sheaths?

A. I believe I testified to that. The tin prices did advance.

Q. What did you testify?

A. The price of tin was gradually advancing. Antimony was obtainable at much lower prices, and we found that a compound of one per cent antimony gave the same physical characteristics so far as subjecting the cable sheath to vibration and bending as the three per cent tin.

Q. Well, you answered my question, Mr. Kositzky?

A. Yes, sir.

Q. On page 1,190, you refer to the change from the old gravity type relays to a new type smaller spring relay. You do not mean to say that the other manufacturers of relays have clung to the old bulky type do you?

A. I cannot answer as to that.

Q. You don't know. Do you know any manufacturer of electrical appliances, telephone, telegraph, light or other products that has been in business through 20 years past and whose product today is as bulky, heavy, complicated as it was ten or twenty years ago.

Mr. Burr: If you call a hen a producer, I suppose it is.

Mr. Shuler: I did not say producers. I said manufacturers. What is your answer?

The Witness: I don't know, I can't answer that.

Q. You can't answer that? You mean to say that the Kellogg people are making the same bulky heavy, compli-
[fol. 9028] cated telephone equipment and apparatus as they did 20 years ago?

A. I don't think they are. I don't know.

Q. Do you think the General Electric has not improved any of its products in the last 20 years?

A. I should not be a bit surprised but what they have. I don't know.

Q. You don't know whether they have or not?

A. Not in detail. Generally, I should think they have.

Q. Don't you know that they have improved for instance the incandescent light or lamp?

A. Oh, if you make your question general, they have.

Q. The Westinghouse has likewise made great progress in manufacturing and producing and marketing equipment has it not?

A. I should say, yes.

Q. Can you give me any public utility company in any city whose service over a period of 20 years has not been improved?

A. I don't believe I can.

Q. In other words, for instance, electric lighting companies' services and equipment have been improved very materially in the past 20 years; is that right?

A. Yes, sir.

Q. Their prices of their product to the consumers have been decreasing all the time during that period, 20 years; isn't that right?

A. I don't know as to detail. In some localities probably they have.

Q. In Ohio, yes; let's take it in Ohio?

A. I can only go back five years.

Q. In that five years has it?

[fol. 9029] A. I think they have increased in the five years.

Q. You think? You think that the Cleveland Electric Illuminating Company prices have increased in the past five years?

A. I cannot say as to that detail, but things in general have increased.

Q. Don't you know that about three years ago they decreased both their power and their household schedule?

A. No, I don't.

Q. Don't you know that within the past month they made another decrease in their power schedule amounting to a million dollars a year?

A. I knew they recently made a decrease to their consumers.

Q. In your schedules of savings you are not making comparisons with the rule or trend of other manufacturing and public service companies, but on the assumption that the telephone art would be today what it was 20 years ago if the General Staff had not performed services under the four and one-half per cent contract; is that true?

Mr. Burr: If he can understand that question, I can't.

Mr. Shuler: Who is to say whether he should understand it, you or I?

Mr. Burr: I have a right to raise the point that the question is not understandable.

Mr. Shuler: But you have no right to say to him that he cannot answer the question.

Mr. Burr: I have not so stated.

Q. Can you answer the question?

A. No, I can't.

[fol. 9030] Q. That would have been your answer earlier, would it?

A. I probably would have had to ask you another question or two.

Q. Now, you cannot ask that other question or two? Now let us have Mr. Kositzky's testimony. Mr. Kositzky, do you not know as a matter of fact that all other lines of manufacturing, including manufacturers for public utilities, have increased their facilities and improved their equipment during the past 20 years?

A. I should say generally yes, that that has happened.

Q. Now, did you take that into consideration when you made up your estimate of savings?

A. No, sir.

Mr. Burr: Why should he?

Mr. Shuler: Let him testify. You can argue.

Q. Mr. Kositzky, when you made up your schedule of savings did you take the telephone art in a static condition as of 20 years ago and consider that if the American Company had not acted in an advisory capacity with the associated companies, there would have been no advancement

in the art of telephony? First, can you answer the question?

A. I don't believe I can answer that question. I have only computed the items of savings. There are probably hundreds of others I have not considered at all. Just a few significant ones.

Q. But do you remember that my question was as to the savings you have computed and not as to savings anyone else has computed? You have computed certain savings have you not?

A. That is right.

[fol. 9031] Q. Nobody knows but you what you considered in your computations; is that correct?

A. Yes.

Q. You did consider certain things when you made your computations, did you not?

A. Certainly.

Q. Did you consider among other things that if the American Company had not its General Staff, the art of telephony would be today where it was 20 years ago?

A. I did not consider that.

Q. You did not consider that? In other words, you took it for granted that without the General Staff the art of telephony would have gone ahead and advanced just the same as all other manufacturing arts have?

A. No, I did not take that into consideration. I just picked out a few items of improvements that I knew the A. T. & T. were responsible for and tried to evaluate them in dollars. I did not consider the advancement in the art at all.

Q. But the other day you said you did not know what they had done in the way of improving the 22 gauge cable didn't you?

A. I merely knew——

Q. Answer my question please?

A. In detail, I do not know what they did do.

Q. On page 1158 of the record you refer to a very careful estimate of your station growth for the coming year, and you said the amount of expenditures necessary for the growth in the coming year, 1924, is eleven and one half million dollars. Can you give us an estimate of the station growth for the year 1924?

A. I cannot give it—I cannot give it exactly. I think it around about twenty thousand.

[fol. 9032] Q. Twenty thousand?

A. Yes, that is the best I can give you now.

Q. What was the growth last year?

A. The growth last year of course was—— We had some abnormal losses, so that it really does not give you a true picture of the conditions.

Q. Were you finished with your answer?

A. Yes, sir.

Q. What was it?

A. Only about four or five thousand is all it grew last year.

Q. What was this abnormal condition you speak of?

A. It was the loss due to the consolidating of certain offices and private branch exchanges in the various cities in Ohio.

Q. Will you give us an estimate of station growth for the next five years?

A. It runs from twenty to twenty-five thousand, not accounting for further duplicate station losses.

Mr. Burr: Is that per year?

Mr. Shuler: Yes, isn't it per year?

The Witness: Yes, per year.

Q. Have you estimated the station losses during that same period?

A. Yes.

Q. What are they?

A. We have it in this manner. We have the gross connections and the gross disconnections. In the disconnections would be the losses, and the difference would be the station gain. They run something like this. The gross connections are about a hundred thousand a year and the disconnections about eighty thousand a year, and the differ-

[fol. 9033] ence is the net gain, twenty thousand.

Q. When you speak of disconnection you mean that you absolutely lose the subscriber or that it might be a transfer by the subscriber from one place to another?

A. It includes that also. It is what we call the in and out.

Q. Do you think that is normal, or is it due to Ohio State phones being disconnected?

A. There is about five in and four out. It has been a little abnormal the last year or two.

Q. You don't seem to answer my question. You said it

was abnormal. Is that due to the fact that Ohio State subscribers are giving up their phones is the question: I — speaking now——

A. That was the case last year.

Q. Now, as to the future, are your losses going to be abnormal, do you estimate?

A. Because of the Ohio State?

Q. Because of the Ohio State subscribers giving up their——

A. No, I think we have had the biggest losses because of that.

Q. You think you have had the biggest losses because of that?

A. Yes, sir.

Q. Have you these estimates of station growth for the particular cities of Cleveland, Toledo, Akron, Canton and Dayton?

A. No, I have not.

Q. Do you think you can get them?

A. I think so.

Q. We would like to have them if we can. Now taking [fol. 9034] again your Exhibit 30, have you assumed the existence of the Ohio Bell Company without the instrument service of the A. T. & T. Company and with other conditions practically unchanged that is, that instrument service savings?

A. Will you read the question please?

(Question read.)

A. I don't know what you mean.

Q. All right. With other conditions practically unchanged, I mean by that that you assumed no change in the market, no inter-relations with other telephones, no other sources of supply than the Western Electric?

A. Why, I did consider the price of instruments as furnished by other suppliers. I have those prices.

Q. And you considered those?

A. Yes, sir.

Q. Now, on that point, Mr. Kositzky, does the Ohio Bell Company furnish any instrument sets to its connecting companies?

A. Very few if any. I cannot cite any cases where they are doing that.

Q. Don't you know, as a matter of fact, that in New York

the New York Telephone Company does furnish these instrument sets to its controlled and connecting companies at 75 cents a year?

A. I don't know. If they do that, the connecting companies are getting a pretty good thing.

Q. And don't you know—Is Mr. Sylvan or Mr. Grace the head of the New York Company?

A. Mr. Thurber.

Q. Mr. Sylvan is the vice-president, I believe?

A. He is the vice-president.

Q. Don't you know that he testified in New York in the [fol. 9035] New York rate hearing case that he did furnish these instrument sets to connecting companies at seventy-five cents a year, for the reason that they could get an instrument set which would render them the service for that price, and that if he did not furnish these sets to them at 75 cents, they would use the other one, 75 cents a year?

A. I didn't know about that.

Q. In your exhibits 31 and 32 of estimated savings, you have imagined the Ohio Bell Company, not only without the developments which came to it through the American Company, but also without any substitutes therefor have you not?

A. I don't know what you mean.

Q. I mean this, Mr. Kositzky; let us suppose that the independent companies have been using all these things that you speak of in 31 and 32 exhibits; they have got them without the payment of the four and one half per cent contract have they not?

A. I think you will find that in most cases they have copied from us, from the Bell companies.

Q. I did not ask you to give me some opinion. I asked you to answer the question I put?

A. You mentioned the independents. They have used some of these savings of course.

Q. Haven't they used all of them? Haven't they used all of them?

A. No, they have not.

Q. They have not?

A. No, sir.

Q. What?

A. They have not used the leading; they have not used the duplex cable; they have not used the 900 and 1200 pair

[fol. 9036] cable unless they purchased it from the Western.

Q. Precisely; they can purchase all of those from the Western Electric Company can't they; didn't Mr. Rhodes so testify?

A. No, they are many things they cannot purchase.

Q. What can't they purchase?

A. They can't get the loading coil; they can't get the repeater.

Q. Where is the repeater used, Mr Kositzky?

A. Long distance transmission.

Q. Certainly. Where is the loading coil used?

A. Both local and long distance.

Q. Certainly. How much is the loading — used in the smaller cities?

A. Not at all for local.

Q. What cities do use a loading coil?

A. In Ohio, Cleveland.

Q. Only one isn't it?

A. Yes.

Mr. Burr: That ought to be enough for you.

Mr. Shuler: It is. Now, again read my question.

(Previous question read as follows: "I mean this, Mr. Kositzky; let us suppose that the independent companies have been using all these things that you speak of in 31 and 32 exhibits; they have got them without the payment of the four and one-half per cent contract have they not?")

A. Those that they have used, copied, I presume they did get without the four and one-half per cent contract, but they probably paid a manufacturer for certain development work which he may have done.

Q. Why do you say probably; do you know whether they did or not?

A. If the manufacturer purchases a patent in that case, [fol. 9037] he would have to add that to the purchase price of the apparatus, while in our case that is a part of the four and one-half per cent service.

Q. Right; and likewise the Western Electric Company adds to its price to the companies what it pays for patents does it not?

A. I am not sure, I don't know.

Q. How do you know so much about other companies with which you have no connection and know so little about the Western Electric?

A. I did not testify that I knew so much. I have been telling you all afternoon that I did not know much about the General Electric, the Kellogg and other concerns.

Q. But you said these other concerns probably add to the cost of the instrument——

A. Naturally, the cost of production.

Q. Do you think the Western Electric would do the same thing?

A. In patents owned by the A. T. & T. Company?

Q. I did not say that, did I? Mr. Rhodes testified that the Western Electric had a certain number of patents did he not?

A. Yes, sir.

Q. And they paid for them?

A. I believe so.

Q. Don't you think they add them in their cost of production for the equipment they sell the Bell associated companies?

A. I don't know. I imagine they do.

Q. Would you say that probably they do?

A. Yes.

Q. Now, on the fine wire cables, 900 pair, 22 guage, the independents can get that can't they?

[fol. 9038] A. I believe they can purchase that from the Western Electric, yes.

Q. How about 24 guage?

A. I think they can get that from the Western.

Q. How about the 900 pair, 22 guage and the 24 guage cables in all sizes, including ducts; can they buy that?

A. Probably can.

Q. That is $10,700,000.00 of your savings that any company can get from the Western Electric; isn't that right?

A. Very likely they can.

Q. In making your estimates you have imagined that the Ohio Bell Company is existing and carrying on a telephone business throughout Ohio without the A. T. & T. and without developing any of those things itself, have you not?

A. No, I am just taking this, Mr. Shuler—Perhaps I better make myself clear—These are things that the A. T.

& T. give us, and where they get them and how they develop them and all those details,—I merely know that they give those to us, and I have computed the savings on the improvement which the A. T. & T. have furnished from time to time.

Q. Right; without considering at all whether those improvements would have been made otherwise, if the American Company had not had its General Staff; isn't that right?

A. I don't know. We got those from the A. T. & T.

Q. Now, Mr. Kositzky, you have been in the telephone business for quite a while and been around through quite a number of the states in managing and advising relative to telephone business; is that right?

A. Yes, sir.

[fol. 9039] Q. Have you been in Michigan?

A. No, sir.

Q. Have you ever been in Nebraska?

A. Not connected with the telephone company, no.

Q. Do you know anything about the independent companies in those states?

A. Very little in Michigan, and not a great deal in Nebraska.

Q. Do you know that the Michigan Commission has stated in one of its decisions——

Mr. Burr: I object. The decision is the best evidence.

Mr. Shuler: Well, I will read it from the P. U. R.

Mr. Burr: You are entitled to go in as a part of the evidence——

Mr. Shuler: Anyhow this witness has never been in those states.

Q. You can imagine the Ohio Bell Company being in the telephone business in Ohio without the long lines of the A. T. & T. can't you, Mr. Kositzky?

A. I can imagine that, yes.

Q. As a matter of fact, they were here first weren't they?

A. The long lines.

Q. No, the local lines; the local companies were all established before the long lines?

A. Yes, I guess that is right.

Q. Now, looking at your map, exhibit page 29, isn't it a fact, that prior to the adoption of the loading of toll cir-

cuits and the use of repeaters there was a Bell Telephone [fol. 9040] Company service in Ohio in no wise dependent on those inventions and developments?

A. I don't know.

Q. You don't know?

A. No.

Q. Can you imagine——

Mr. McConnaughey: He has testified to it.

Q. Here is your Exhibit 29. There are some non-loaded 165 copper limit; isn't that right?

A. What was your question, Mr. Shuler?

Question read.

A. Yes.

Q. So you want to change your answer?

A. Yes, the loading was only introduced in 1901 and there were telephones here prior to that date.

Q. Now, Mr. Kositzky, can you imagine the existence of the long lines of the A. T. & T. Company without the Ohio Bell Company and the other associated companies in the Bell system?

Mr. Burr: I would like to ask counsel what he means by that question. Can he imagine the existence of the company? I confess I don't understand it.

Mr. Shuler: Our contention is that these repeaters and loading coils and most everything else, the transmitters and receivers, are all forced on the local companies as capital expense for the purpose of increasing and developing long line business, and to charge the long lines toll company ten per cent of this four and one half per cent contract price is unfair and unreasonable, that they should pay a much larger proportion if the Commissions are going to allow [fol. 9041] that contract to continue. I was bringing it out from statements of what Mr. Sylvan testified to in the New York case. He testified that the reason he gave those transmitters and receivers for instance to these associated companies or these connecting companies rather, that it increased his toll business and it was a good business proposition for him to do so. To be perfectly fair with you, I will say that he also said that he paid nothing to the American Company for those transmitters and receivers, that they gave them to him gratis, and what he received, the 75 cents

a year, he received from those connecting and controlled companies, was gravy.

Mr. Burr: That does not answer my objection to your question, which is that the question as propounded is not intelligible; at least it is not to me

Mr. Shuler: The witness has not said it is not intelligible to him.

Mr. Burr: I have a right to object because it not intelligible to me.

Mr. Shuler: No, you have not.

Mr. Burr: Yes, sir, I have a right to object.

Mr. Shuler: Yes, but not because it is unintelligible to you.

Commissioner Poor: I think the language is intelligible and the witness may answer.

The Witness: Will you read that question.

(Question read.)

The Witness: Just a long lines plant alone? Yes.

[fol. 9042] Q. Under what conditions would it be operating?

A. They could have their own terminals.

Q. Where in Cleveland for instance?

A. They would have pay stations in certain localities.

Q. Then if one wanted to use those he would leave his home and go to the pay station and use it; is that right?

A. Yes. That just depends on the number of such stations scattered about throughout the city.

Q. But the business of the A. T. & T. Company with such an arrangement in your opinion would be very small as compared with the amount of business it would have by having connection with the local associated companies; isn't that right?

A. Imagine it would be smaller. I don't know how small.

Q. It would be smaller wouldn't it?

A. Yes, sir.

Q. Isn't it your opinion that the Ohio Bell Companies are more essential to the American Company than the American Company is to the Ohio Bell Company?

A. I don't know. It think it is mutual.

Q. Fifty-fifty?

A. Oh, I can't say.

Q. Well, mutual doesn't mean anything. That is my contention?

A. I know it is a great help to people in Ohio to be able to talk to Chicago, Denver, Philadelphia, Pittsburgh, New York and Chicago.

Q. Now, take the cable between Akron and Cleveland; that is used to a large degree for A. T. & T. messages is it no, or long lines department messages of the A. T. & T. [fol. 9043] Company?

A. Oh, no, that is primarily a Cleveland, Akron cable.

Q. Isn't it used at all for the long lines department?

A. To a certain extent. They still have their open wire lines that parallel this cable.

Q. How does the traffic go from Akron to Detroit?

A. I don't know exactly, but I think it goes to Maumee, which is a point south of Toledo, by way of open wire, and there it is switched through Toledo to Detroit.

Q. Aren't you the construction engineer of the property?

A. You ask me questions about somebody else's plant that I have nothing much to do with.

Q. The Ohio Bell does a great deal of operating for the A. T. & T. messages does it not?

A. Yes, they do quite a little and the A. T. & T. does quite a little for us.

Q. You have not attempted to separate the operation for the A. T. & T. from the operation of the Bell proper in the estimate of savings due to the single ticket method have you?

A. No, I did not testify as to that at all, Mr. Shuler.

Q. On page 1092 you referred to a provisional specification for a concrete steel re-inforcement of poles, and you introduced it as Exhibit 10. Is your company actually practicing this re-inforcement?

A. I cannot answer that definitely.

Q. You cannot answer it?

A. No.

Q. How long have you had those specifications?

[fol. 9044] A. Since about the date they were issued.

Q. When?

A. I would have to look up the date of that particular specification.

Q. Approximately when?

A. They have been in existence a number of years.

Q. Isn't the Akron, Cleveland toll cable of sufficient capacity to carry all of the toll traffic between Akron and Cleveland, including the former Ohio State traffic?

A. No, sir.

Q. It is not? Why didn't you engineer it big enough to do so.

A. This cable was engineered about six years ago.

Q. You had nothing to do with the engineering of it?

A. No, but it was about as large a cable as you can place on a full line and get under one sheath. For an aerial cable it is a full size cable. It is not practical to make them larger.

Q. Do you know whether or not the General Staff engineered it?

A. They had been out on this job and they were consulted in connection with this work as I remember it.

Q. When was it constructed?

A. It was engineered a little over six years ago, and constructed about six years ago as I remember it, perhaps a little more than six years.

Q. Turning to the concrete steel re-inforcement of poles, does this method have the effect of prolonging the life of poles?

A. Yes, sir.

[fol. 9045] Q. Shouldn't it have an effect on the service life of poles as estimated for the purposes of the depreciation account?

A. Yes.

Q. Why don't you use it?

A. I cannot say that we do not. I merely have no knowledge that it is being used. You asked me if it was used and I said I did not know.

Q. You are the construction engineer; have you taken it into account in your estimate of future service life of poles?

A. We work on averages, average conditions.

Q. But did you take it into account?

A. Specifically?

Q. Certainly?

A. Oh, there are thousands of things, Mr. Shuler, that we take into account and of course, naturally that was taken into account.

Q. By whom is it taken into account?

A. In arriving at the service life of——

Q. Please, Mr. Kositzky, let the stenographer read my question and you answer it.

(Question read.)

A. By us, the Ohio Bell Telephone Company.

Q. Who is us?

A. I have a great deal to do with it.

Q. Who else has a great deal to do with it?

A. The field people are consulted.

Q. What are their names?

A. The division engineers, division superintendents.

Q. I mean their names, the names people recognize them by on the street?

A. Here in Columbus.

Q. Mr. Schneider?

A. Mr. Cherry, Mr. Schneider.

[fol. 9046] Q. Now in your rate cases when you testify do you take that into account in your estimates of the future service life of poles?

A. Yes, we take everything into consideration.

Q. Do you I said.

A. Yes.

Q. Now, you said that you do not know whether any of those poles are in existence in the state. Then, why and how can you take it into account in your estimate?

A. I say we work on averages and we take all things into consideration.

Q. You mentioned the adoption by the Cleveland Railway of Cleveland of remote control of sub-stations, some of the equipment being manufactured by the North Company; do you know whether they have a system of remote control of telephone exchanges?

A. I believe they have. I am not familiar with the details.

Q. Has your company any of them in use?

A. No, sir.

Q. Has it made any use of the machine switching equipment manufactured by the North Electric Company?

A. No, sir.

Q. You mentioned, page 1151, an item of special service received from the American Company for information and instructions in connection with machine switching or automatic service in different cities. What manufacturing company's equipment does it include?

A. Largely that manufactured by the Chicago Automatic; also that manufactured by the Western Electric.

Q. Is that all? Any others?

A. That is all.

[fol. 9047] Q. The Chicago Automatic is the Stroger?

A. Yes, sir.

Mr. Connaughey: Is that the name of the company?

The Witness: I think it is the Automatic Electric Company.

Q. Is what places has the Ohio Bell Telephone Company installed machine switching equipment?

A. Youngstown, Massillon, addition to Alliance, addition to Washington, Court House; those are the only ones—besides many private branch exchanges.—The Union Trust is one.

Q. I don't care for private branch exchanges. Has the company definite plans for installation of such equipment in any other cities?

A. Yes.

Q. Where?

A. We have plans—when you say "Definite plans" you mean just engineering plans.

Q. Yes?

A. They have not yet been approved by the company.

Q. For what cities?

A. Columbus. Some day in Toledo. Cleveland. Some day in Canton. Future additions to Akron.

Q. Is that all?

A. Generally that is all.

Q. Do you know of any plans heretofore made for such installations and definite steps taken which have been abandoned?

A. Yes, we have. There were such cases.

Q. Where?

A. We have such a case in Cleveland. When I say, "Abandoned" my answer will mean postponed. Two cases in Cleveland. At one time we had a very preliminary plan for Akron which was postponed.

[fol. 9048] Q. You don't know of any work which has been abandoned?

A. Perhaps there was one case that we were considering at one time. That was in Dayton, Dayton-Fairview?

Q. Has that been abandoned or postponed?

A. That is for the time being off of our slate.

Q. In what other places have such installations been postponed?

A. I think that covers them all.

Q. In your instrument service savings you assumed I suppose that the Ohio Bell is getting from the A. T. & T. Company neither instruments nor financial service.

Mr. Burr: Do you understand the question, Mr. Kositzky?

The Witness: No, I don't believe I do.

Q. It means simply this, that you are testifying what some other company would have to pay for this service if it were not for the four and one half per cent contract.

A. I testified that if we were not getting this instrument service it would cost us that to get this instrument service.

Q. So that it is based on the assumption that you were not getting any instrument service from the American Company?

A. That is right.

Q. Also that it was not getting financial service.

A. I don't see just where that comes in.

Q. The reason is this; in your estimate you place eight per cent for interest and you say in your testimony you are getting loans from the American Company at 5.88?

A. Let's call that eight per cent interest. You might say [fol. 9049] eight per cent return, which is commonly used by the engineers as interest. That is return on investment.

Q. You want to change that to eight per cent return on the investment?

A. Usually in our annual charge calculations we call that interest. That is, money put in property should yield a return of eight per cent, or interest, as it is commonly called.

Q. It assumes a first cost per cent of instrument at $4.50?

A. Yes, sir.

Q. And not $3.42, the cost to the A. T. & T.?

A. I have no information that we could buy it for $3.32.

Q. 42 I said?

A. 42 cents.

Q. But you do have information that that is what the A. T. & T. Company pays the Western Electric for it?

A. Only as I heard Mr. Rhodes testify.

Q. You assume that were it not for the four and one half

per cent contract, the associated companies among which is the Ohio Bell Company, could not buy in quantities at any lower price than $4.50 do you not?

A. That is right.

Q. I notice you have an administration of one per cent on a half million of instruments at $4.50, amounting to $22,500; is that right?

A. Yes, one per cent is administration.

Q. Now, what would be that administration?

A. That is generally also called general expense and is a part of the general expense that is capitalized.

Q. Of what does it consist?

A. Oh, it is the portion of the general expenses, such as [fol. 9050] the general accounting, insurance—There is quite an item of general expense as outlined in the uniform system of account.

Q. You have all of those items of expense now, to the Ohio Bell do you not, even under the four and a half per cent contract?

A. That is right. They are allocated, however, to the construction items.

Q. No, I mean on these instruments?

A. I can't say that we have. If we had more property, more to do, we would have more expense.

Mr. Burr: Instruments are not included in the inventories or appraisals.

Mr. Shuler: I know they are not. But they had to take care of these instruments.

You have to go and get them and take them to the Western Electric when you want to exchange, and you have all of that to do now under the contract do you not?

The Witness: We have. Of course, they are turned over to us and we distribute them—We have nothing to do with the responsibility for the ownership.

Q. But you have to pay taxes on them do you not?

A. The A. T. & T. pays the taxes.

Q. Aren't you acquainted with the contract? The contract says that the Bell Company has to pay the taxes.

A. I won't dispute what is in the contract.

Q. Then you didn't know that the contract compelled the Ohio Bell to pay all taxes? Can you answer that?

A. Are these taxes reimbursed to us by the A. T. & T.?

[fol. 9051] Q. I did not ask you that. I asked you whether you knew something?

A. I don't know. That is news to me if that is so.

Q. Now, explain to us the difference of administration charge in the case of where a man owns the instrument and where he merely leases it.

A. There is a considerable difference. We haven't the responsibility of the ownership and insurance and we haven't the same bookkeeping and financial——

Q. Is financing a part of the administration?

A. No, bookkeeping, however, is.

Q. You certainly have to keep books about them?

A. Yes, but if we own them we have a different system.

Q. What would the difference be?

A. Capital accounts.

Q. Would that amount to $22,500.00 a year?

A. Yes, I think it would. It would be an allocation of the expense to all of the property.

Q. You think it would cost you $22,500.00 a year to take care of the administration if you owned the instruments in excess of what it is costing you to do it under your system of leasing?

A. Yes, I believe it would. You have got to take the investment of property there.

Q. But you are charging also in this statement, eight per cent return on it and eight per cent depreciation and two per cent maintenance and two per cent taxes?

A. Those are all different items.

Q. What is maintenance?

A. That would be for the replacement of parts and re-[fol. 9052] adjustment of parts and so on, to keep them in repair.

Q. Now, Mr. Kositzky, can't you give us something concrete as to an item of additional expense to the Ohio Bell Company if they owned these sets as against their leasing the sets?

A. Not any more than I have, Mr. Shuler. If we had several million dollars worth of property we would have several million dollars worth of property to take care of, and that would add to your cost of administration.

Q. But these sets are in the homes of people are they not?

A. Yes, but they are on our books.

Q. To put them on your books would not cost you much money would it?

A. Yes, to keep a different kind of record of it, it would.

Q. Aren't they on the books now?

A. Not as property.

Q. No, but they are on the book?

A. I don't know just how they are on the book other than just the numerical number that is carried to tell us the number we have.

Q. You are sure?

A. No.

Q. You don't know from the books of your company, you cannot tell, who has telephones in their homes?

A. We know who has telephones, certainly, but not who has these instruments.

Q. Could we have a telephone without the instruments?

A. Yes, sir, without an instrument of this character, yes, sir.

[fol. 9053] Q. In Cleveland?

A. Yes.

Q. What for instance?

A. Ohio State; foreign make instruments.

Q. In your savings you have added and included all of the instruments in the State have you not?

A. That is right.

Q. Which the A. T. & T. never purchased or paid for?

A. No, they are ready to replace them at any time we wish them to be replaced.

Q. Mr. Rhodes, in his exhibit had seven per cent depreciation. You have an eight per cent depreciation. Why the difference?

A. I cannot account for his seven per cent, but I do know that our eight per cent is representative of what our depreciation for the type of apparatus that the instrument is a part of—That is, the sub-station account.

Q. How do you arrive at that per cent?

A. From studies and from various——

Q. Let me put the question this way, Mr. Kositzky. Do you arrive at that by finding out when you got the instrument and when you junked it?

A. I took the same rate for an instrument that we used for a sub-set to which the instrument is attached. That is eight per cent.

Q. Now what is the life of a receiver?

A. It is usually about four or five years.

Q. It is junk within four or five years; is that right?

A. No, I won't say that, but its life in one locality is four or five years.

[fol. 9054] Q. Then if an instrument actually exists 20 years, but is moved five times during that period, you say its service life is four years?

A. Yes.

Q. Will you tell me why you need to estimate the service life of an induction coil as less than say 40 years?

A. That again is computed the same as the rest of the equipment. If the instrument, the induction coil in one locality is removed and it is good, why the salvage will be considered accordingly, so whether it is 20 years in one locality or four years in each of five localities, it will be practically the same.

Q. Its service life is four years in either instance?

A. The salvage makes up the other point. The depreciable amount is the same.

Q. As a matter of fact induction coil should last for 40 years, that is, its construction would enable it to live for 40 years or have a service life for 40 years?

A. If you consider the material only, I don't know. It may be longer than that. It may be less than that.

Q. Now, because that is a part of a telephone which is moved every four years, you make the depreciation on that induction coil the same as the thing to which it is attached; is that right?

A. We must necessarily do that, Mr. Shuler.

Q. I don't care about that, Mr. Kositzky. I want your answer yes or no?

A. The depreciation is computed on the basis of life in years in one locality. If it is used over and over again the [fol. 9055] salvage takes care of the difference.

Q. Then, if in Cleveland people were of a roving nature and the average removal was once a year, your depreciation would be how much?

A. The depreciation in that case, of course, would be higher, because you are losing the installation every time and you are losing its removal every time.

Q. What do you mean by losing the installation and the removal? Did you answer the question?

A. No. If the instrument were in service one year, the life would be one year and the salvage would probably be 90 plus per cent.

Q. Oh, Mr. Kositzky, Mr. Crunden is going into that. Can't you answer my question yes or no?

A. I don't believe I can.

Mr. Burr: He could not answer that one by yes or no.

Mr. Shuler: Why not? Didn't you give him the answer? How do you know, Mr. Burr, what questions Mr. Kositzky can answer?

Mr. Burr: Read the previous question.

Mr. Shuler: I don't care about it.

(Question read.)

A. They would wear out and be moved.

Q. Let us cut out all of this and let Mr. Kositzky answer my question and not go into any learned discussion of depreciation. Why do you need to estimate the service life of an induction coil as less than, say, 50 years.

[fol. 9056] A. Because they are not in place or in service in one locality 50 years.

Q. But that does not mean that induction coil is junked at the end of a lesser time?

A. Oh, it may be junked in much less time. It may be destroyed by fire. It may be obsolete. There may be a dozen reasons why it will be thrown away.

Q. Why do you estimate the life of a receiver at less than, say 20 years?

A. For the same reason.

Q. Why?

A. The receiver is not in service in one locality on the average of 20 years.

Q. Why do you estimate the life of a transmitter at 20 years?

A. Same reason.

Q. Give the reason?

A. Because it is not in service in one locality for an average of 20 years.

Q. But there are no parts of the mechanism or any of them or the material or any of them which would cause them to be or have a service life of only four years is there?

A. Four years is our experience, four or five years, and I don't know what else I can answer.

Mr. Shuler: Read the question to Mr. Kositzky.

(Question read.)

A. You mean total service life or service life in one locality?

Q. Total service life?

A. The total service life would be more than that.

Q. Certainly. Now how much more?

A. I don't know. That depends upon the art, destruc-
[fol. 9057] tion for various reasons, wear and tear, obsolescence. We only go by our experience as to the service life in a particular locality.

Q. Do you in your considerations take into consideration your judgment as to the future?

A. Yes, together with our experience in the past.

Q. During the years in which there have been changes in patterns in transmitters and receivers you have been working toward a standard of transmission have you not?

A. Yes, sir.

Q. And you have been adjusting your entire plant to that standard both in cables, wires, central office equipment and toll lines have you not?

A. Yes, sir.

Q. What changes can you conceive in the transmitter that would compel the Bell Companies with their many millions of dollars investment adjusted to the present transmitter, to change the type at a total loss or at any loss?

A. I can only say that the advancements have been made in the past right along and I have every reason to believe that there will be advancements in the future.

Q. Do you expect those advancements to cause you a loss on your present plant?

A. On the transmitters and receivers, you are talking about now?

Q. The changes in those, yes?

A. We don't own them so it would not be our loss. It would be the A. T. & T. loss.

Q. I said, are you considering any changes in transmitters or receivers in the near future which would cause you a loss, a considerable loss, in your plant or equipment other [fol. 9058] than the receiver and transmitter?

A. No.

Q. You can't?

A. I can't right at this minute.

Q. Have you had any experience of great changes that caused a loss to the rest of the equipment or plant?

A. No, they usually acted the other way, as benefits rather than losses.

Q. In the matter of repairs at two per cent, do you include the repairs of breakages in the receiver shells and transmitter mouth pieces?

A. Those repairs that the A. T. & T. furnish.

Q. You consider the repairs that the A. T. & T. furnish. How do you know what that per cent is?

A. In certain cases, I have had the amount in dollars and reducing that to a per instrument I get this percentage that has run from one and one half to over two per cent.

Q. That is the actual experience of the A. T. & T. in the repairing of shelves and transmitter mouth pieces; is that right?

A. That is the repairs of the transmitters, receivers, and induction coils which they are responsible for.

Q. Who furnishes the repairs to the mouth pieces and receiver shells?

A. At one time they were furnished by them, by the A. T. & T. Company; I don't know whether they are furnished by them now or not.

Q. Do you include the repairs of breakages to the receiver cords in this two per cent?

A. No.

Q. You don't?

A. No, sir.

Q. Do you include any attention that may be given by [fol. 9059] the trouble man at the subscriber's premises?

A. No, sir.

Q. Is your statement as to the average excess of five per cent sets of instruments above stations actual or estimated?

A. It is computed at first actually about four and a fraction per cent, I used five.

Q. You say it is computed at what?

A. It was computed—It was actually a little less than five and I took it as five.

Q. What is it?

A. From actual information?

Q. From your experience in your Bell Company you carry that excess do you?

A. That is, in the plant, yes. As I stated before they were the instruments at private branch exchanges and where the party chooses to have two receivers rather than one, instruments at switchboards. It is nearly five per cent in excess of the subscribers' stations.

Q. Will you get us the actual figures of stations and sets of instruments for Toledo, Dayton, Massillon and Cleveland?

A. I cannot answer.

Q. Can't you get it for us?

A. I am not sure. I would have to see whether it is available.

Q. Can you divide the extra instruments into classes, as for instance, company switchboards, P. B. X. switchboards, extra receivers and so on?

A. I might be able to do that.

Q. Mr. Kositzky, do you mean that in Cleveland you have 105 per cent or rather an excess of five per cent of sets [fol. 9060] of instruments above the stations there?

A. Yes, sir.

Q. And under the contract you have to pay 75 cents a month for all over three per cent don't you?

A. No, that is three per cent not in service, three per cent in stock. We are given instruments—we are entitled to instruments for every use we may make of them in the service of the company, and in that also is included those instruments used in linemen's test sets. Now on top of that A. T. & T. permit us to have in our stock three per cent additional, and the Western carry three per cent on top of that.

Q. Why should an extra receiver be classed as an extra set of instruments?

A. It would not be an extra set. It would be an extra receiver.

Q. Your statement shows an extra stock of these instruments to insure continuity of supply of six per cent, is that right?

A. Yes, sir.

Q. You don't actually do that, do you in Cleveland or in any city in Ohio?

A. I don't know as to any particular city, but we do in the stock in the state as a whole. I think that is right. Supply is a sort of flexible thing. It is liquid.

Q. That would be thirty thousand sets for the State would it not?

A. Three per cent of——

Q. No, six per cent. Your statement is six per cent?

A. That is right.

Q. Stock of instruments to insure continuity of supply, [fol. 9061] six per cent additional?

A. That is right.

Q. You don't carry actually six per cent?

A. We carry about three and the Western Electric carry about three.

Q. Does the Western Electric also carry for you an excess of the other part of the instrument, for instance, the stand on which these instrument sets are placed?

A. Of course, they are our suppliers and they carry a stock of supplies and we carry a stock of supplies.

Q. Mr. Kositzky, do they carry for you as many telephones as they do of these instrument sets?

A. I don't know.

Q. Do you carry as many telephone sets in excess as you do instrument sets?

A. Sometimes more and sometimes there is a shortage and we have less of course.

Q. What in your opinion would be the largest per cent of telephones that you ever carry in excess?

A. I could not answer that.

Q. Ever as much as six per cent?

A. Oh, yes.

Q. Do you often have on hand thirty thousand extra telephones for the State of Ohio?

A. Yes. At one time we had more than that. And then there are times again, when there is a shortage and we haven't them and we have much less than that.

Q. What would you say would be the average, Mr. Kositzky?

A. Why, I really don't know.

Q. Of what other classes of material, if any, does the Bell carry a stock equal to six per cent in excess?

[fol. 9062] A. Well, we carry hardware, cable, poles, wires,—I won't say six per cent, but we have a very large investment in supplies.

Q. Mr. Kositzky, supposing you have a million poles in plant, do you carry in stock six per cent or 60,000 poles?

A. I don't know.

Q. Do you think that you carry anything like that number in supply?

A. I couldn't answer that.

Q. Do you think you carry an excess of six per cent of anything, an excess of anything equal to six per cent of the sum in the plant?

A. I think so.

Q. What for instance?

A. I think we carry—I am only giving totals—We have a supply account of considerably over a million dollars of supplies that we carry, and I don't know just how that is divided.

Q. What is it?

A. I don't know how that is divided between the various items.

Q. What is your total plant value of that same material?

A. I couldn't tell you offhand.

Q. Don't you know that it is in the neighborhood of seventy-five or eighty millions?

A. You are speaking now of the total property in place including real estate.

Q. Yes?

A. We would not carry any real estate, buildings, switchboards, conduits. You are speaking of material now. Material is a small part of it. The plant material is a small part of that seventy-five or eighty million dollars.

Q. You testified as follows: "What effect does the re- [fol. 9063] tirement of those Ohio State instruments have upon the capital account of the company?" Your answer was, "Whenever one is taken out the plant an amount equal to what is supposed to be on the books is written off of the books; in other words, the books are reduced as fast as these come out." Are we to understand from this answer that the amount is written off of the capital account?

A. Yes, sir.

Q. And an instrument is substituted then from the A. T. & T.

Mr. Shuler: I think I am through. I am not certain, but if not it is only two or three questions. You will have that duct thing figured out tomorrow?

The Witness: Yes. What is that? The four and six duct?

Mr. Shuler: You and I can figure it out together.

The Witness: All right.

And thereupon the further hearing of this matter was adjourned to Thursday, April 24, 1924, at ten o'clock.

[fol. 9064] Thursday Morning Session

April 24, 1924.

And also G. A. Kositzky, resuming the stand for further cross examination, continued his testimony as follows:

Cross-examined by Mr. Shuler:

Mr. Shuler: Mr. Burr, when can you give that Metropolitan area?

Mr. Burr: Mr. Shuler, I meant to ask you whether you referred to the Cleveland Exchange area?

Q. Mr. Kositzky, what is the number of telephone stations in the Cleveland Metropolitan district or the Cleveland Exchange district?

A. About 160,000.

Q. Now, Mr. Kositzky, you testified it would be about $11,500,000 that would be expended this year by the Ohio Bell Company; is that right?

A. Yes, sir.

Q. What are just a few of the larger items constituting that expenditure?

A. One very large item is our routine expenditure of putting in telephones and the incidental work necessary in connection with that, like stringing short spans of wire and poles.

Q. Rather in the nature of equipment and materials?

A. That is over $4,000,000 in itself.

Q. Which? The equipment and materials?

[fol. 9065] A. That is the money expenditure necessary to put them in place, yes.

Q. Now, those materials and equipment, from whom are they purchased?

A. They are largely from the Western Electric Company.

Q. From the Western Electric Company?

A. Yes.

Q. Do you contract with them at one time for a large amount?

A. We do it this way, Mr. Shuler. As soon as we know what our construction program is, we sort of divide that into principal items, like number of poles, conductor feet of cable, number of telephones, private branch exchanges, and we give them that information before the year in which the materials are required, and then we notify them from time to time as to how rapidly we want that material delivered.

Q. Is it delivered in large quantities at a time?

A. Reasonably large quantities. Of course, we also have specific requisitions or an order for the items, but they know about how rapidly they are to supply those things.

Q. Deliveries are made in amounts of as high as $200,000 at one time, are they?

A. Oh yes.

Q. And more?

A. Yes, their monthly billing is sometimes much more than that.

Q. Does the Ohio Bell Telephone Company ever advertise for bids when they want to make any purchases of material or supplies?

A. Not in all cases.

Q. Do they ever advertise for bids?

A. Yes.

Q. How frequently do they advertise for bids?

A. I might explain that: advertising for bids in connec-
[fol. 9066] tion with conduit work or buildings——

Q. I am talking about material and supplies only.

A. No.

Q. You never advertise for bids for material and supplies?

A. Not telephone material so called, no.

Q. Equipment?

A. No.

Q. And all the purchases that you make from the Western Electric are made without any advertising whatever?

A. That is right.

Mr. Burr: Mr. Shuler, do I understand these questions of yours are now directed to the proposition or the sugges-

tion that the Western Electric contract is not a beneficial one to the American Company?

Mr. Shuler: No, that it is an illegal contract.

Mr. Burr: That it is an illegal contract?

Mr. Shuler: That the acts of the Ohio Bell Company are illegal and in violation of the Clayton Act.

Mr. Burr: You do not contend that the rights of the Ohio Bell Company after that contract are not beneficial to the Ohio Bell Company, do you? I ask that for this reason——

Mr. Shuler: We have asked for that information to find out whether it is or not.

Mr. Burr: If you will excuse me and let me finish my remarks, early in this controversy the question of the payment under the license contract and the question of the benefit accruing to the Ohio Bell Company under the Western Electric's contract were adverted to from time to time, and it was stated in the record that there was no issue [fol. 9067] raised as to the fairness of the Western Electric contract and the fact that it was of advantage to the Ohio Bell Company to have that contract. Now, if you are going——

Mr. Shuler: Who said that?

Mr. Burr: I don't remember. Probably you were not here. But that is in the record. If you are going to open up that question. We would like definite information on the subject, because it is contrary to what I understand the record to be thus far, and we have proceeded on the theory that the Western Electric contract was conceded as a beneficial one to the Ohio Bell Company.

Mr. Shuler: Well, I don't know a thing about that myself, speaking only for myself.

Mr. Burr: We would like to know at this time whether you are going to raise that issue, so that we might be governed accordingly.

Mr. Shuler: I understood Mr. Gentsch's motion to raise the issue, that is, he wants the American Telephone & Telegraph Company in this hearing either as a party or as a volunteer witness to furnish just that very thing.

Mr. Burr: Oh, that has nothing to do with the Western Electric contract.

Mr. Shuler: Yes, that is what his motion is, as to the Western Electric contract. My motion that I made is the

books of the A. T. & T. for the four and one half per cent contract. Mr. Gentsch's motion is to have the A. T. & T. made a party, so that the contract between the Western [fol. 9068] Electric, or rather the dealings between the Western Electric and the associated companies may be examined, and we can see whether or not the Western Electric Company is making an exorbitant profit.

Mr. Burr: Now, he did not do any such thing if you will pardon me for saying so. If you will read his remarks you will find he did not even say Western Electric Company so far as I can remember.

Mr. Shuler: Mr. Chairman Poor asked him to reduce his motion to writing and I just happen to have read his motion.

Mr. Burr: This is a very late date at which to inject an issue in the case——

Mr. Shuler: As far as my questions are concerned, Mr. Burr, it does not raise that question as I see it, but I do understand that Mr. Gentsch's motion will raise that question.

Mr. Miller: Nobody on this side of the table seems to know anything about that supposed concession.

Mr. McConnaughey: What record do you refer to, Mr. Burr?

Mr. Burr: There are so many records Mr. McConnaughey, that it is a little difficult for one to remember.

Mr. McConnaughey: The question was never raised in the Dayton record, that is, it was never discussed one way or the other. You asked the specific question at one time whether we questioned the four and one half per cent contract. We said we did. That was the only discussion or [fol. 9069] anything of that kind we ever had.

Mr. Burr: Well, it is not too late to look at the record and see what it says on that question.

Mr. Shuler: I am through with that question, so that we can look up the record at our leisure.

Commissioner Poor: Yes, do that.

Q. Mr. Kositzky, do you have telegraph service working over your telephone circuits?

A. Yes.

Q. In your savings for the phantom circuits is there included the telegraph service?

A. No, sir.

Mr. Dotson: May I ask a question on that, Mr. Shuler?

Mr. Shuler: Yes.

Mr. Dotson: You speak of the service in a limited sense, Mr. Kositzky. Is that applicable to all exchanges or is it in a greater degree in use in some exchange areas than others?

The Witness: Well, that is primarily in the toll plant, Mr. Dotson. It would not be applicable to the exchange but very, very slightly.

Mr. Dotson: I have observed in the Toledo exchange area that all telegraph accounts seem to be certified to the Bell Company and presented along with the Bell Telephone Company's bill where that service has come in over a phone call.

The Witness: We have no commercial telegraph service at all. That is merely a commission we receive for transmitting messages over the telephone to the telegraph office, I think, what you have reference to.

[fol. 9070] Mr. Dotson: I just wondered whether that collection was confined to the service of the telegraph company that was received over telephone service.

The Witness: I believe so although we do get some leased line revenues where some of our long distance circuits, that is, the telegraph facilities of our long distance circuits are leased to brokers and large merchants and so forth; but it is not what you might call a commercial program. It is merely Morse facilities.

Q. Mr. Kosiztky, what are the present average prices of telephone equipment as compared with the pre-War level?

A. They are considerably higher.

Q. How much would you say?

A. Pre-War, 1915, '16, along in there you mean?

Q. That is what I understand?

A. I would say about 40 per cent.

Q. About 40 per cent higher?

A. Perhaps 50; along in there.

Q. Do you know whether or not the Ohio Bell Telephone Company charges off more today for depreciation of plant and equipment than it did five years ago, the Ohio Bell Telephone?

A. I don't just exactly understand that question. You mean the same unit of equipment?

Q. No, I don't mean that. I mean the composite.

A. That is, for one section of switchboard would we charge off more today than we did before?

Q. No, composite plant; for the plant.

[fol. 9071] A. In the value per unit or in dollars.

Q. Per cent I said.

A. Well, if there was more plant I would charge off more, of course.

Q. Your percentage is the same, but your total amount is probably different. About the percentage I am talking. What percentage do you charge off for plant and equipment in the Cleveland exchange area today?

A. I don't know.

Q. You don't?

A. No.

Q. Now, as a constructing and operating telephone engineer, don't you know anything about the development of the art of telephony except as you receive information or advices from the General Staff?

A. Yes, sir.

Q. You do?

A. Yes.

Q. Do you know anything about what the independents are doing in other states?

A. To a very limited extent.

Q. Very limited. Now, in your estimate of savings by the use of the phantom circuit, are those savings based on the assumption that the General Staff originated them and are to be given the sole credit for savings?

A. The General Staff——

Q. No, please answer my question.

A. We got the information from the General Staff.

Q. Will you please read my question, and then answer it yes or no.

(Question read.)

A. Yes, if I might add to my answer——

Mr. Shuler: No, you have answered it.

Mr. Burr: Just a moment please. Let him finish his [fol. 9072] answer.

The Witness: I might add to my answer that the General Staff gave us the information and developed so far as I know the practical use of the phantom circuit.

Q. Then I understand you to say that the General Staff told you that they developed the phantom circuit.

Mr. Burr: He didn't say any such thing.

The Witness: No, I didn't. Mr. Rhodes can probably better answer that than I can.

Mr. Shuler: Read his answer.

(Answer read.)

Q. The General Staff gave you the information; what do you mean by that?

A. They gave us the diagrams, which show the transposition methods of physical circuits to make a phantom possible. Together with that they gave us the specifications for the equipment, phantom coils necessary at each end of the physical circuit, to make the phantom possible. That information we received from the General Staff.

Q. They developed so far as you know the phantom circuit; what was the development that the General Staff made?

A. You are asking me questions that Mr. Rhodes is more competent and qualified to answer than I.

Q. Then you are not qualified to answer what the developments made by the General Staff were?

A. No, sir, not in detail.

Q. You testified that there were 18,765.18 miles of phantom circuits in the Ohio Bell system; is that right? Yesterday you testified to that, didn't you?

A. 18,765.18 miles.

[fol. 9073] Q. How many miles of physical toll circuits in the state?

A. I don't know. I haven't that information.

Q. Can you get it for us?

A. Yes.

Q. You will get it for us?

A. Yes, I can get it for you. The miles of physical toll circuits——

Q. In the system?

A. The Ohio Bell system.

Q. Yes.

A. All right.

Q. Now, Mr. Kositzsky, don't you know as a matter of fact that the independent manufacturers came out with phantom circuits about 1902; don't you know that inde-

pendent manufacturers came out with phantom coils about 1902 or '03?

A. No, I do not.

Q. Don't you know that they were installed on independent lines about that time?

A. I don't know that they were.

Q. Do you know Sergius P. Grace of New York?

A. Yes, sir.

Q. What is his position with relation to the New York Telephone Company?

A. I think his position with the New York Company now is similar to Mr. Williams with this company.

Q. What is that?

A. He is sort of on special work in connection with valuation work. At one time I think he made depreciation studies for the New York Company.

Q. He was a former independent man, was he not, Mr. Kositzky?

A. I am not certain. He was with the Pittsburgh Company in years gone by, but that is a Bell Company.

Q. If he testified before the New York Public Service Commission that the manufacturers came out with phantom [fol. 9074] coils, I think around 1903 or '04 or something like that, what would you say as to whether or not that was probably true.

Mr. Burr: I object to that.

Commissioner Poor: The objection is well taken. I think that objection is well taken.

Mr. Shuler: It is a purely hypothetical question.

Mr. Burr: I know, but what difference would this witness' opinion of what Mr. Grace may have said as to its truth make?

Mr. Shuler: He was an independent operator.

Mr. Burr: Well, that might be.

Mr. Shuler: Note an exception.

Q. Now, in your savings on the 22 gauge wire did you give the General Staff credit for all units of cable, irrespective of size?

A. Just what do you mean?

Q. Well, I mean this. There is 22 gauge cable; you have simply 22 gauge cable; then you have it in pairs?

A. Yes, in sizes.

Q. And originally, I believe, there were in 150 pairs, were there not, or maybe lower?

A. Not in Ohio.

Q. I am talking about the art now, Mr. Kositzky.

A. Oh, there were various sizes used by these various companies. They had their own standards. I know Philadelphia used 240 and 480. St. Louis had a 120, 240 and 480; sort of a standard with that company.

Q. Yes, but I say they are in many different sizes from that up to the 1200 pair size; is that right?

A. Yes.

Q. Now, in your savings did you give the General Staff [fol. 9075] credit for developing the 22 gauge wire in all sizes?

A. What do you mean by wire?

Q. Cable?

A. You mean the manufactured product.

Q. Sure.

A. Now, wire has been used in sizes of 22 and smaller as wire long before the art of cable was known.

Q. Certainly. I am talking about the 22 gauge cable in all sizes; is that intelligible?

A. All sizes used in Ohio?

Q. Anywhere—no, in Ohio.

A. We got the information from the A. T. & T. Company and I gave them credit for it.

Q. And you gave them credit for the whole development, from the smallest units to the largest units?

A. That is right. I gave them credit for the savings because they gave us the information.

Q. And if independent manufacturers originally put out the 22 gauge wire, and originally put out the lower sizes from 400 down, then your estimate is incorrect at least to that extent, is it not?

Mr. Burr: I object to that.

The Witness: No, it is not.

Q. It is not?

A. No.

Mr. Burr: The question is argumentative anyhow.

Q. Mr. Kositzky, in determining the average service life of a plant, do you determine it from your knowledge of the plant and other similar plants?

A. Those are some of the factors that enter in.

Q. Those are some of the factors, aren't they?

A. Yes.

[fol. 9076] Q. Do you also consider any information that is available as to what the life on the average of the property now in service is going to be?

A. Yes, that enters in.

Q. That enters into it also, does it not?

A. That is a factor, yes.

Q. Do you consider the condition of the property involved?

A. I don't know as that is really a factor.

Q. You do not think that is a factor?

A. It might be to a very limited extent.

Mr. Shuler: I am through. I think some of the other counsel have questions.

Commissioner Poor: Have any of the other counsel any questions?

Cross-examination.

By Mr. Laylin:

Mr. Laylin: I would like to ask a few questions if I may.

Q. Mr. Kositzky, you have had approximately 19 years of experience with various associated companies?

A. Yes, sir.

Q. You are at present Chief Engineer of the Ohio Bell?

A. That is right.

Q. Now, let me ask you what facilities has your department of the Ohio Bell for research?

A. We have no facilities for research.

Q. In other words, your department has no facilities to [fol. 9077] make exhaustive tests and analyses?

A. No, it would require a larger force, of course, additional space and apparatus and a considerable addition to our organization to conduct work of that character.

Q. You depend, do you not, for that kind of service upon the General Staff?

A. That is right. Some of the other manufacturers—I think Mr. Shuler mentioned some yesterday—have such laboratories, such as the General Electric and the Westinghouse. They have laboratories and they conduct experiments. But the Ohio Bell Company relies entirely upon

the A. T. & T. for that information. Now, we could not do all of the research work that the A. T. & T. perform.

Q. You depend upon their recommendations involving your methods of work and also in the equipment and purchase of the materials?

A. We depend upon the development work, yes.

Q. You are familiar, are you not, with the fact of the ownership of the Western Electric Company by the American Telephone & Telegraph Company?

A. Yes, sir.

Q. Now, can you cite any instance in which an associated company or the Ohio Bell Company has purchased a particular class of equipment or material from outside sources?

A. Yes.

Q. Wait until I finish my question.

A. Pardon me.

Q. Of which the Western Electric Company had a similar article, in other words, a competitive article?

A. Yes, I have personal knowledge of purchases of poles [fol. 9078] directly from the supplier and not through the Western Electric.

Q. When was that?

A. That was a few years ago. It was handled by me personally. And we have purchased and are purchasing apparatus right along from suppliers other than the Western Electric Company.

Q. Can you detail what they are?

A. Yes, we purchased considerable for the city of Canton.

Q. What was that you bought?

A. That was Central Office Equipment, additions to the equipment that was there.

Q. That is, additions to the independent equipment which was there in existence?

A. That is right. And I might state that the Stromberg-Carlson Company are manufacturing all small switchboards for us. The Kellogg are manufacturing instruments, substations for us of the magneto type.

Q. Just a moment——

Mr. Burr: It is responsive to the question.

Mr. Laylin: My question——

Mr. Burr: Read the question.

Mr. Laylin: Let me finish what I have to say. I asked

him as regards articles which are competitive in character, and I want him to have that still in mind is all.

The Witness: We purchased considerable equipment for Cleveland from the Stromberg-Carlson people; also for Toledo from the Kellogg people; and in Canton from the Kellogg factory, that is, Central Office equipment, types similar to which the Western Electric make.

Q. The Western Electric Company makes stuff that would be usable in the same way as this?

[fol. 9079] A. Very much the same, yes, and we recently purchased an entirely new installation at Massillon of an automatic type, and the Western make automatic, but of a different type; it is of the panel type. This is the step by step type that we purchased for Massillon.

Mr. Burr: Did you say where that was purchased?

The Witness: From the Stroger Automatic—from the Automatic Electric Company of Chicago. And at Youngstown we purchased nearly a million dollars worth of equipment from the same company. And the Western Electric Company make- automatic equipment and we could have purchased from the Western.

Q. Weren't all those purchased, Mr. Kositzky, to harmonize the new equipment with that which was already in place?

A. Not in Massillon.

Q. Not in Massillon, but in the other instances?

A. In Youngstown it was an entirely new installation and in the Bell Building. There was an installation similar to that in another building.

Q. Mr. Kositzky, I want to read here from your testimony and will ask you when I have included to indicate whether this is correct or not?

A. Yes.

Q. This relates to a description of your experience only. After having gone into the employ of the New York and New Jersey Telephone Company you then after a time went to the Pacific coast, as I understand it?

A. Yes, sir.

Q. And returned again to New York later?

A. Yes, sir.

Q. You stayed in New York and then you say in 1911 "I was transferred to St. Louis as plant engineer of the old [fol. 9080] Bell of Missouri, which was a Bell Company

operating mostly in St. Louis and vicinity." And then you say, "And the following year I was transferred to Kansas City."

A. Yes, sir.

Q. And after detailing your work there and describing the consolidation of various Bell companies you stated that, "I was transferred at this time to St. Louis, reporting to the operating vice president, and had general supervision of the plant operations and also inventory and appraisal work." Then after going into your appraisal work in some detail you said in response to this question by Mr. Burr, "After your service with the Southwestern Company what did you do?" And you replied, "I was then transferred to Chicago and promoted to the position of Chief Engineer for the Central Union Company; this was in 1919." And then your last change was stated as a transfer to Cleveland to the position of Chief Engineer of the Central Union?

A. Of the Ohio Bell.

Q. Of the Ohio Bell; now is that correct?

A. Yes, sir.

Q. What I would like to know is, who transferred you?

A. Those transfers were, so far as I know, due to several people.

Q. Well, can you guess who? I will give you one guess.

Mr. Burr: I don't think the witness ought to guess.

A. My first move to the Pacific Company, Mr. Bloom, who was at one ti-e President of the Ohio Bell Company, was detailed by the Pacific Company to perform a certain job on the Pacific coast, and he took three men with him, and I happened to be one of the men, and I credit that move to [fol. 9081] Mr. Bloom.

Q. Who was he detailed by?

A. I really don't know.

Q. What was his position then, could you say?

A. Mr. Bloom at one time——

Q. At that time.

A. I think at that time he was the division plant superintendent of the New York and New Jersey Company, of the Jersey Division at Newark.

Q. You do not know who detailed him to go to the Pacific coast?

A. I don't know unless it was at the request of the Pacific Coast Company for help.

Q. A request for whom?

A. The same as we were in trouble in Ohio with our merger I asked for help, and I naturally went to the A. T. & T. Company and they furnished me a man.

Q. Your assumption is that he was detailed by the A. T. & T. Company and you went with him to assist him?

Mr. Burr: He hasn't any knowledge on it.

Mr. Laylin: Oh well, let him answer.

The Witness: I don't know except that the A. T. & T. may have asked for help and Mr. Bloom might have been recommended. Whether it was directly through the A. T. & T. or some other source I don't know.

Q. When you went to the Pacific coast did you have any negotiations with that company prior to your going?

A. Not with that company, no, sir.

Q. When you were transferred from New York to St. Louis how was that effected?

A. That was through negotiations with a gentleman by the name of S. L. Gilman, who was General Manager of the [fol. 9082] Bell of Missouri and also the Missouri and Kansas.

Q. Who had the negotiation?

A. Between Mr. Gilman and myself.

Q. You applied for a job?

A. Not exactly. Mr. Gilman interviewed me when I was in College for a position and I presume he still remembered me. He was at one time an employee of the Western Electric Company.

Q. Who transferred you to Kansas City?

A. That was by Mr. Gilman.

Q. Aren't they separate companies or weren't they at that time separate companies?

A. Only in this way. They had a common general manager. They were separate companies, but they had a common general manager.

Q. Tell us which companies were which there.

A. The Missouri and Kansas Company and the Bell of Missouri had at that time Mr. S. L. Gilman for their general manager. Each had its own operating organization under the general manager. They had a common president, I believe a common general auditor, and certain other common officials.

Q. Then you were transferred back to St. Louis; is that correct?

A. Yes, sir.

Q. After leaving Kansas City?

A. Yes, sir.

Q. When you were transferred to Chicago who transferred you?

A. My negotiations then were with Mr. Bloom, who was at that time the President of the Central Union.

Q. You had no instructions to go?

A. Oh, it was optional with me. I was merely offered the [fol. 9083] position, and I accepted it. It was a promotion to a better position than I had, and I very gladly accepted.

Q. Was the same thing true when you moved from Chicago to here?

A. When the Central Union was divided into state organizations, it was a matter there primarily of allocating the employees from Chicago to the various states, and I was fortunate to draw Ohio.

Q. Who allocated you here?

A. That was during the time that Mr. E. A. Reed was president, who in the meantime had been promoted to the presidency of the Ohio Bell.

Q. You did not discuss matters at all with New York?

A. I did not, no, sir.

Q. You did not?

A. I don't know if anyone else did or not.

Cross-examination.

By Mr. Hagelbarger:

Q. You have an Exhibit No. 4 of toll fundamental plan; do you recollect that?

A. I think I had an Exhibit showing a bulletin.

Q. Showing what?

A. A bulletin, or a general engineering circular prepared by the A. T. & T. which treats of the preparation of toll fundamental plans.

Q. You have testified also with relation to the value of exchange fundamental plans?

A. That is true.

Q. You practice the making of fundamental plans with the advice and assistance of the A. T. & T.?

A. Yes, sir.

[fol. 9084] Q. The essence of such fundamental plan or indeed of any engineering is to get your desired results with a minimum of expenditure, without waste of material or labor?

A. That is right.

Q. And in your telephone plans you make these careful studies so as to not construct too many ducts or too many pole lines or too many offices or any particular construction too large; is that true?

A. That is right; that is, economical size.

Q. So as to not have those you do construct too large?

A. Not too large; I would say large enough.

Q. Yes, large enough. Now, any construction man with experience in construction work in telephone plants and without any engineering assistance, if he had money enough, could build a telephone plant large enough for any given purpose, couldn't he?

A. If he — that without engineering plans, I would have my doubts as to the economy.

Q. You would have doubts as to the economies of the construction?

A. Yes.

Q. But he could build it large enough if he had enough money, couldn't he?

A. Yes, sir, he could also build it improperly and also too small.

Q. I am talking now about size. But if he did not study his needs and his economies in advance, he would waste a great deal of money very likely, wouldn't he?

A. He might, yes.

Q. In your engineering, you do limit your program and your building of ducts and lines and equipment according [fol. 9085] to the relation between costs and needs, do you not?

A. Yes, sir.

Q. You make your sizes and lengths and types of construction prove in?

A. Yes, sir.

Q. Just so far as possible?

A. Yes, sir.

Q. That is, unless they are expected to pay for themselves they are not constructed?

A. Not always.

Q. So far as possible I say.

A. Taking the exchange as a whole, there might be ragged edges where it is doubtful whether that particular construction would prove in, but we have to do it in order to give a universal service. But taking the exchange as a whole, it will wash out.

Q. But, generally speaking, that is true?

A. Yes, sir.

Q. You have some things in your plant that would not be there if they cost even twice as much as they actually do?

A. I don't know just exactly what you mean by that.

Q. There are some things in the plant that are there because of the low cost rather than because they are absolutely necessary and essential?

A. No, we would not build anything unless it was necessary and essential.

Q. My question would relate to those things that are there in place of something else, because of the cost of the two things?

A. We have a certain purpose to accomplish and we try to accomplish it in the practical and economical manner.

Q. And if one thing costs say twice as much as it now costs and the cost was in that respect prohibitive, you would try to use something else in place of it that did not cost so [fol. 9086] much?

A. That is right, to accomplish about the same purpose.

Q. Now, referring to your Exhibit 31 showing savings in exchange plant, as you have stated in your calculation of duct saving, you have taken the basis that wherever by use of cables of smaller gauge wires and more wires in a cable, you could have dispensed with a duct; you have assumed a saving of two ducts; is that true?

A. Let me just explain there.

Q. Did you say that yesterday in your cross examination?

A. I said something along that line.

Q. Now, does it need explanation?

A. I don't believe your question is exactly in line with what I answered.

Q. Is it substantially true as to what you stated?

Mr. Burr: Let him answer.

Mr. Hagelbarger: I am going to give him a full chance.

Mr. Burr: You have interrupted him twice.

The Witness: In connection with every occupied duct there are also unoccupied ducts, and the percentage filled

of a conduit system is about 50 per cent, and that is a practical and economical basis of experience over many, many years.

Q. But did you say that you were saving two ducts?

A. In this way——

Q. Where you were putting the cables into one duct?

A. In this way, Mr. Hagelbarger. If we had cables of half the number of pairs, requiring twice the number of cables, we would have twice the conduit system, which would take with it the idle ducts as well as the occupied ones in [fol. 9087] order to get the same place and have the same capacity.

Q. Do any of the bulletins of the A. T. & T. General Staff recommend the 100 per cent excess of ducts?

A. No, sir.

Q. In construction?

A. No, sir, that is a condition that cannot be avoided. Let me make that clear.

Q. Go ahead.

A. If we have requirements for a conduit down a particular street, we will say that the economical period, for reasons which, if you care, I would be very glad to explain, shows an eight duct run, eight compartments, with capacity ultimately of eight cables. We would not consider actually eight cables the first year after the conduit is laid. We would run one duct. We would then have one duct. Seven eighths of the ducts would be idle. We generally provide an emergency duct, and it would never be completely filled. And the cities also in Ohio usually require a fire and police cable. Six would be our maximum use. For the first year we would only have one occupied. Now, that, averaging over the state, 50 per cent filled, is rather a high efficiency in the conduit system. We could not lay four ducts unless we wanted to tear up the street shortly after that, leaving two ducts available for the city and for emergency, but we would build the conduit system for an economical period, taking into consideration the tearing up of the street, the restoration of the pavements and excavating and all that.

Q. What is that economical period?

A. Now, that depends. Where there is paving it is longer than where there is not paving, and in city streets generally we have paving. We look forward to about ten [fol. 9088] to eighteen years as an economical period for which to lay ducts.

Q. Now, may we not assume in a case where your engineering studies have determined for you the right number of ducts, or in some cases as you mentioned nine ducts instead of eight, your studies should show to be enough, that is, nine ducts in existence, with four ducts actually in use, on your savings calculation, as I understand, you could save one of the ducts in use, reducing the ducts in use, and the ducts normally worth while to hold in reserve on your plan of two for one to six, actually you have nine ducts or three times the number in use; how may we infer that you did not engineer for enough ducts in the first place or that you have too many ducts in the second place? Which of those two is true?

A. If I understand your question, Mr. Hagelbarger, you might have such a condition. On the other hand you might have a condition where you have to reinforce that conduit immediately because of the smaller number of pairs per cable, in which event you would have to go to the expense of taking up the pavement, restoring the paving and laying a parallel duct line either on that street or an adjacent street, so that you might have a case where the facilities would be there to take care of this additional cable, and yet you would have other cable where you would have to immediately make enlargements, and that latter is usually the case.

Q. You have not answered the question yet, have you?

A. Then I am sorry.

Q. Can you answer the question?

[fol. 9089] A. I haven't got the question. You better read it.

Q. The last part of the question is, may we infer that you did not engineer for enough ducts in the first place or that you have too many ducts in the second place.

Mr. Burr: Yes, but the last part of the question depends upon the first part of it, and if the question is to be repropounded to the witness I would like to hear all of it. There are several conditions in the question. Will you read it please, Mr. Stenographer?

Mr. Shuler: Yes, I will read the question.

Q. This is the question, Mr. Kositzky. May we not assume your case where your engineering studies have determined for you the right number of ducts, or as in some cases you mention nine ducts instead of the eight that your studies

show to be enough, that is, nine ducts in existence for four ducts actually in use; on your savings calculations I understand it, you could save one of the ducts in use reducing the ducts in use to three, and the ducts normally worth while to hold in reserve on your plan of two for four to six?

A. No, I don't get that at all.

Q. You don't? Didn't you practically say that in your cross examination yesterday?

A. Not reducing the ducts. I am merely saying the additional ducts we would have to have if we did not have nine or twelve hundred pair cable. I am not reducing the number of ducts at all in my saving. I am merely showing the additional conduit investment we would have to have if our cables were of the old type used prior to the develop-
[fol. 9090] ment of the fine wire and 912 and 1200 pair.

Q. Now, in Akron, Dayton and Toledo in the acquisition of the Ohio State System you have more conduits and ducts than you can use, haven't you?

A. I don't think so.

Q. How do you arrive at that?

A. In some localities we haven't enough.

Q. But in some of those cities you have more than you can use, haven't you?

A. Probably into the Central Office. I think there are cases of that kind.

Q. Have you made a study so that you can say to this Commission that there are not more ducts acquired from the Ohio State System than you can use?

A. Not in detail, but in general I think I can answer that question. The Ohio State built a conduit system for their needs. We built a conduit system for our needs. This was built some time ago presumably to last say ten to eighteen years. At the expiration of that ten to eighteen years, each company, if they continue, or one company now, would necessarily have to enlarge their conduit system, because the conduit is not built with capacity for the ultimate load but only for limited periods. So in order to continue growth, instead of going into the cities mentioned and building additional ducts, the ducts we find today is only an economical margin, and it is only about a fifty per cent occupancy, which is not unreasonable.

Q. You mean to say there will be a fifty per cent occu-
[fol. 9091] pancy in those three cities I have named after you get the consolidation of the two properties complete?

A. It averages out that way. We are not withdrawing many cables. Cables are all in use.

Q. Well, you have twice as many unused ducts for those cities?

A. You also have twice as many used ducts.

Q. Are you sure?

A. In some cases one plant is larger than the other, so that it would not be twice.

Q. Don't you know that it is entirely guesswork on your part in estimating how soon those ducts will be filled?

A. It is not entirely guesswork.

Q. Don't you know many of those ducts are not likely to be filled within the next fifty years?

A. I can't imagine any such conditions.

Q. Well, taking into consideration the cables with the larger capacity of these small wires?

A. All cables runs will give a larger capacity, but that does not mean we would have to reduce all cables there today.

Q. You are assuming that there will be no improvement in the fineness of the wire and reduction of the space necessary to be occupied by cables in ducts?

A. No, I am not. I understand there are further improvements of cable under way, and that will postpone the day of enlargement.

Q. It will postpone it for many years?

A. In some sections, yes. In others——

Q. Why do you say——

Mr. Burr: Let him finish.

Mr. Hagelbarger: All right. In others what?

[fol. 9092] Mr. Burr: You butt in and start in on a new question and drown out the witness' voice.

The Witness: In other sections again that would not be so where the capacity now is rather limited. It would be interesting to know that in a number of instances the conduit systems of the two companies do not follow the same streets or alleys. They are on alternate streets. So that in time if one company only had been in the field at the outset, they would have built conduits in those streets at a later date. So that it works out quite to an advantage to have these conduit systems. As I said, there are instances where they enter the office and the office is abandoned, and there are ducts there that will have to be written off of the books. But there are not many of those.

Q. Have you engineered these conditions in these cities or are you just speaking generally?

A. I have in Dayton.

Q. You have what?

A. In Dayton. I went into that to a limited extent, yes, sir.

Q. But only a limited extent?

A. Enough to satisfy ourselves of the possibilities of the use practically of all of that conduit.

Q. Is that the only place?

A. Yes, in Ohio.

Q. So that from the limited engineering attention you have given to the Dayton situation you have assumed to testify here with regard to the whole State of Ohio outside of Cincinnati?

A. I said in Ohio. I have made also studies of that character in Joppa, Missouri and in——

[fol. 9093] Q. I am talking about Ohio.

Mr. Burr: Just a moment. Let him answer.

Q. Did I ask you about Joppa?

A. No, you did not. You asked me about my studies of duplicate conduit situations.

Q. Here in Ohio?

Mr. Burr: Wait just a moment please. As I understood counsel he asked the witness whether or not he had made studies in other places and whether except as to Dayton it was not a mere guess. Now, the witness is proceeding to tell you where he has made other studies.

Mr. Hagelbarger: And I told him it is not responsive and I am going on to something else.

Mr. Burr: No, because he has a right to explain to you why it is not a mere guess. And that was what he was proceeding to do when you interrupted him.

Q. What has Joppa, Missouri, to do with Ohio?

A. We had a situation of two telephone plants of a reasonably good sized city, perhaps not as large as Dayton or Canton, about 8,000 telephones. I made a study of Kansas City, of the conduit system. St. Louis, Missouri has about 16,000 telephones. Topeka, Kansas has about 12,000 phones—at that time. And Wichita, Kansas and some other points—Dallas, Texas.

Q. This saving hasn't anything to do with Joppa, Missouri?

A. No, this is the possible use of conduit systems where they were built by two separate companies. Fort Worth is another case. Seattle, Washington another.

[fol. 9094] Q. Now, you have done no engineering in Toledo or Akron in regard to the use of ducts of the two companies?

A. No.

Q. And yet you have applied your savings plan to those ducts which have been acquired from the Ohio State system just the same as you have to the original Bell ducts?

A. No.

Q. You have not?

A. No.

Q. You are excluding those, are you?

A. I have merely stated this, that I have computed the additional ducts required, if we had to have more cables because of the fewer number of pairs that were taken.

Q. Over what period of years does your additional ducts required extend?

A. Cables as they exist today.

Q. Over what period of years does your number of ducts saved extend?

A. No period of years. Merely this. I have taken the cables as they existed to give us the same facilities we have today.

Q. When are you going to use these ducts you save?

A. They are being used right along, the ducts that are vacant, I mean.

Q. That is, you are filling up ducts every week or two?

A. Yes, sir.

Q. Do you know how many ducts unoccupied there are in the State of Ohio?

A. I said about fifty per cent. We are building new ducts every month.

Q. When were the first ducts constructed in Ohio, or do you know anything about it?

A. Only very generally. Sometime prior to 1900 or [fol. 9095] around 1900, along in there.

Q. Do you know how many of those ducts originally constructed are filled to capacity?

A. No, sir.

Q. Have you ever made any study of that?

A. I don't know that such a study would help us.

Q. I asked you if you ever made a study of it?

A. No.

Q. The Ohio Bell Company engineered the construction of ducts in Ohio previous to the use of these 900 and 1200 pair cables?

A. Yes.

Q. Isn't it a fact whenever a conduit and ducts therein are engineered in any particular street, is there a record made of the prospective length of life? When a conduit and the ducts therein are engineered for a particular street in the city, is there a record made of the time within which they will probably be required to be filled up to capacity?

A. No, sir. We merely follow the best engineering practice as to the size of ducts required at that time, so far as we can forecast into the future.

Q. You do that without reference to the length of time that in your opinion it will take to fill it to capacity?

A. You asked me about a record. We have no detailed record. But when we complete a conduit system we feel that we build it for the purpose of lasting a certain number of years.

Q. How many years?

A. From ten to twenty or ten to eighteen, as I testified.

Q. Well, that depends entirely upon the growth of the [fol. 9096] city, doesn't it?

A. Oh yes, that is what we take into account, the number of lines that will be required in that ten to twenty year period. We reduce that to cables and cables are reduced to number of ducts, and in that manner we determine the size of the conduit.

Q. Now, in this saving you are assuming that you are going to occupy the duct that you save first rather than the duct—the extra duct occupied last that you have saved, aren't you?

A. I don't know just exactly what you mean.

Q. You are figuring on a saving of ducts, aren't you, and you have given some figures here to this Commission on how much in money your saving in the State of Ohio in occupying ducts will be; that is, you have saved, we will say, one or two ducts in a conduit; you have saved those for future use; is that right?

A. No, not exactly that way.

Q. That is what it means, isn't it?

A. No, it means this, that if we had more ducts occupied because of the more cables necessary on account of the fewer number of pairs per cable, to get the same conditions we have today we would have to have this additional investment in conduit to give us the same condition we have today.

Q. Now, many of these ducts have in the larger wires, haven't they, cables with the larger wires?

A. Some of them, yes.

Q. Many of them?

A. Trunk cables, for instance; we are placing cables of that type with a larger wire as being a larger cable, and cables to remote points we are still using larger wire cable, [fol. 9097] which is still a standard cable for that use today.

Q. If it would require from ten to eighteen years to fill up the ducts in a conduit, then you want this Commission to take into account the saving of ducts when they are not now needed, don't you.

A. No, I don't believe I said that.

Q. Isn't that where you come out? Isn't that the result?

A. I think not.

Q. Isn't that the result of your statement?

A. No, not exactly. Our investment in Ohio today would be this much greater in conduit.

Q. How do you know it would?

A. According to my computation.

Q. With the vast number of unoccupied ducts in the State of Ohio?

A. That is a psysical condition that exists and that you cannot get away from.

Q. It is always fifty per cent, isn't it?

A. I wouldn't say it is always that. It might be more and it might be less. But it is within a few per cent of fifty.

Q. So that you want this Commission to allow this on the theory that all of the ducts are now occupied?

A. No.

Q. You don't?

A. No, I merely wanted this Commission to see what has been saved in Ohio, because of taking advantage of the improvements in the art of cable so far as——

Q. There is nothing saved until the ducts are all full and you are required to build new conduits and ducts?

A. You must now misunderstand me. There are certain conduits that have one out of eight in use; there are certain [fol. 9098] others that have six out of eight in use; so that there are many others that would have had to be enlarged and this investment made if it had not been for this saving or this development of cable.

Mr. Hagelbarger: That is all.

Cross-examination.

By Mr. Miller:

Q. Mr. Kositzky, referring to the early part of your testimony on cross examination as to method of appraisement of jointly used poles, I want to see if I understand you correctly. As I understand it, the pole that is jointly used by your company and another company and is owned by the other company, that is not set up in your appraisal at all?

A. No, sir.

Q. On the other hand if that pole is owned by your company it is set up in your appraisal as though it had not been used by any other company?

A. That is right.

Q. What do you do when the ownership is disputed?

A. We go according to our record.

Q. In other words, if another company claims that pole, and you claim that pole, you set it up in your appraisal because you claim it?

A. We set it up according to our best record, yes, sir.

Q. That is what you did in the Canton case?

A. Yes.

Mr. Burr: It is not in evidence that there is any place [fol. 9099] where they are in dispute.

Mr. Miller: Oh yes, it is.

Q. Don't you know that the ownership of a considerable number of poles in Canton is disputed?

A. I don't know whether there is or not. I know there was such a case in Dayton, and from the final outcome as I understand the testimony the company, you might say, had rather underclaimed than overclaimed.

Q. In Dayton?

A. Yes.

Q. Don't you know that there are a considerable number of poles the ownership of which is claimed by your company and the Northern Ohio Traction & Light Company?

A. I don't know that it is true.

Q. Don't you know that your company arranged with the Ohio Power Company to check over the jointly occupied poles in order to determine the ownership of the poles between your companies?

A. I don't know whether it was or not. It possibly was. It was done in Youngstown for our own information. There was certain work of that kind done in Cleveland. I wouldn't be a bit surprised if it was done in Canton.

Q. Don't you know that before that work advanced very far so many disputes arose that the Bell Telephone Company refused to continue the work and the Ohio Power Company went on and completed its investigation?

A. No.

Q. You didn't have any part in that work?

A. No, sir.

Q. You didn't delegate any men to do it?

A. No.

Mr. Miller: That is all.

[fol. 9100] Recross-examination.

By Mr. McConnaughey:

Q. Mr. Kositzky, you stated you had made a detailed study of the duct occupancy situation in Dayton as between the Ohio State and Ohio Bell systems?

A. Yes.

Q. Was that study reduced to writing?

A. No, it is not. I don't think it is. We merely have information as to the systems, and there is no report written on it if that is what you mean.

Q. No.

A. No report made on it.

Q. Will you give us the details of that study?

A. I have no objection.

Q. Can you do it now?

A. I haven't it here, no.

Q. When can you do it?

A. I could not answer that, Mr. McConnaughey.

Q. Well, we have a date set for cross-examination of you and others in the Dayton case, I think week after next. Can we have it in advance of that?

A. I will be glad to look into that, Mr. McConnaughey.

Mr. McConnaughey: That is all.

By Mr. Shuler:

Q. Did you get my figures over night, Mr. Kositzky?

A. What figures were those. I thought we worked them out last night.

Q. What we talked about over here.

A. I thought we worked them out last night.

Commissioner Poor: Any other questions of this witness? [fol. 9101] Are there any more questions of this witness?

Mr. Dotson: I just want to call his attention that I note by the record that I made a request for some information to this effect; I find that I asked you to furnish complete supporting data of cost of fundamental plan of Toledo, showing the portion of the costs incurred by the A. T. & T. Company and the amount incurred by the Ohio Bell Company.

The Witness: I haven't that, Mr. Dotson. In the first place that was made in 1919 when I was in Chicago or 1920, along in there, and I haven't the details of that cost, but I can tell you about what it would cost to make such a fundamental plan including the commercial forecast, commercial survey, and the fundamental plan layout, including the office locations, conduits, lay-outs, sizes and so on. It would be between 25 and $50,000, the complete fundamental plan.

Q. There was, however, a plan made, as I understood?

A. Yes, sir.

Q. It was with reference to that plan that I desired this information. Would it be much of a hardship or really difficult to secure that, Mr. Kositzky?

A. Yes, it would. I have been trying to get that since your request, Mr. Dotson. I am sorry that I have not had a great deal of success.

Q. As a matter of fact you have not succeeded in getting it yet?

A. No, I have not.

Q. If you can you will furnish it?

A. I think I testified as to the number of man days spent [fol. 9102] by the A. T. & T. Company. I believe that is in the record. I don't know the salaries those men were paid or their traveling and living expenses while on this particular job away from home.

Q. I don't remember whether you stated who prepared that fundamental plan?

A. That was one of the first ones made and we had considerable assistance from the A. T. & T. Company on that Toledo plan.

Q. But it was not made under your supervision?

A. Oh yes.

Q. It was after you came in?

A. It was under my supervision and with the assistance of the A. T. & T. Company.

Mr. Burr: Were you then in Chicago or Cleveland?

The Witness: I was in Chicago at that time.

Mr. Burr: If there are no other questions I should like to postpone the reexamination of Mr. Kositzky until we have had an opportunity to go through his testimony and also in order that the other witnesses here from a distance may be examined and excused. It has occurred to me in the few remaining minutes at the morning session. I would like to ask Mr. Kositzky a few other questions in order to clear up a few points before we go away.

Commissioner Poor: You have a half an hour. Tomorrow will end up our time.

Mr. Burr: I only wanted to ask Mr. Kositzky at this time on the matter of the stock of instruments on hand as compared with other material on hand.

The Witness: The stock of instruments, as testified, is six per cent, and that compares very closely with the other [fol. 9103] supplies carried by the company. For instance, we have supplies and materials not in service in round numbers of about $2,000,000 worth in Ohio. And taking the plant in which that material is used, save the outside plant and the substation plant, it figures something like $61,000,000 in place. Now, in that $61,000,000 there are such items as labor and freight and many other expenses. So, reducing that sixty one millions to materials only, it would be about half or about $30,000,000 of that sixty is strictly materials. Now, thirty million into two millions is about six and two thirds per cent. And I might say that

the materials that are used like routine materials would be more than six per cent and others like conduits would be less.

By Mr. Burr:

Q. You were asked whether or not in your judgment the Ohio Bell Company would have made no progress without the services of the American Telephone & Telegraph Company. What have you to say about that?

A. Undoubtedly we would have made some progress, but it would have been at the Ohio Bell's expense, and we could not have made the progress that was made in the manner in which it was made. That is, we could not have had the development forces as employed by the A. T. & T. who handle it for a very large number of companies, and the expense would have been much greater for such development that we could have made.

Mr. Shuler: I move that that all be stricken out.

Q. What have you to say——

Mr. Shuler: I move that that all be stricken out, because [fol. 9104] this witness does not know a thing about what he is testifying to except, if at all, for the last five years.

Mr. Burr: Rubbish. He has been in the service nineteen years.

Mr. Shuler: Not in Ohio.

Mr. Burr: He has qualified to answer it.

Mr. Shuler: Another reason I object is, this witness in answer to a question of my own said that he knew nothing about the independent telephone companies of the state. Now, how can he testify as to where the Ohio Bell Company would have been without the four and one half per cent contract, when he knows nothing about where the independent telephone companies are who have not been paying the four and one half per cent contract.

Mr. Burr: I submit the answer is proper.

Mr. Shuler: Besides he said he knew little, but very little, about the trend and improvements in other businesses in the United States during the last year, including the Electric Light & Power Companies.

Q. Now, I will ask you another question.

Commissioner Poor: Wait a minute. Of course, that question covers a period of time longer than this witness

has been with the Ohio Bell Company. If the question is meant to cover the time he was actually with the Ohio Bell Company, I think the objection to that part of it is not well taken.

Mr. Shuler: May I make another suggestion? While we did not take the time to go into detail as to all of the things [fol. 9105] he has claimed his savings on, I submit that this Commission should decide from Mr. Kositzky's testimony as to the fact that he knew nothing about what the General Staff had done on the 22 gauge cable nor on the phantom circuits.

Mr. Burr: He is not a member of the General Staff.

Mr. Shuler: I mean to say this, that this witness' testimony on cross-examination has shown conclusively that all he knows about what the General Staff has done is what somebody told him they had done. He personally could not tell me one thing that the American Company had done with relation to the 22 gauge cable or the improvement thereof, and could not tell me one thing that the American had done on any improvements thereof or on the phantom circuits, and I insist that this witness has shown an absolute ignorance of the actual work, if any, done by the American staff except so far as somebody has told him. Also let me call your Honor's attention to this one thing——

Commissioner Poor: The Commission has ruled on your objection.

Mr. Shuler: You intimated it might be good for five years.

Commissioner Poor: Your objection is sustained beyond that period, when this witness came with the Ohio Bell Company.

Mr. Burr: Just addressing myself a moment to the testimony of counsel which has just preceded——

Mr. Shuler: No, it was a recitation of your witness' testimony.

[fol. 9106] Mr. Burr: The witness Mr. Rhodes has testified as to what the American Company did with reference to the development of the phantom circuits and the fine gauge wire. Mr. Kositzky is not a member of the General Staff.

Mr. Shuler: May I ask you, Mr. Burr, to state precisely what Mr. Rhodes said as to the 22 gauge wire?

Mr. Burr: No, I would not undertake to quote the record on the subject.

Mr. Shuler: Do you admit that he said they did nothing——

Commissioner Poor: If you gentlemen want to argue this out between yourselves all right, but I do not see that there is anything before the Commission.

Mr. Burr: I am simply answering a statement which was uncalled for and which was made by counsel for the other side. Mr. Rhodes has testified what the American Company did in that respect. Just to set ourselves straight with this Commission, Mr. Kositzky is not a member of the General Staff. He did not perfect the phantom circuits nor the fine wire cable. He is not here for the purposes of stating to this Commission what services his company has received from the American Company. The fact that the services were offered and were taken advantage of and the extent to which they were taken advantage of and the savings resulting from the use of those suggestions what he is talking about. Now, I merely inject that here in order, if possible, to clear up part of the misconception which seems to me to be in the minds of counsel for the city of Cleve-
[fol. 9107] land. Mr. Kositzky is not the man who developed the fine wire cable. He has not posed as a member of the General Staff or as having anything to do with the development of the cable. He has, however, shown this Commission the fact that the suggestion for its use did come from the American Company and the savings to the Ohio Bell as the result of those suggestions and the use of that cable. That is all I have to ask at this time.

Mr. McConnaughey: Mr. Commissioner, at the request of Mr. Gentsch and on his behalf and on behalf of others, in his absence I want to renew the motion he made to Mr. Rhodes' testimony in reference to this witness' testimony, that all of the testimony that he has given with reference to the value of these services and the savings because of them be stricken from the record.

Commissioner Poor: We will take that motion under advisement.

[fol. 9108] And also A. B. Crunden, recalled as a witness for the purposes of cross examination, testified as follows:

Cross-examined by Mr. Dotson:

Mr. Shuler: It is understood that Mr. Kositzky is not excused, because of the extra data that he is to furnish.

Q. Mr. Crunden, you testified in this case in Chief February 28th of this year and at that time you stated that your position with the American Company was general supervisor of accounting methods, and that you had occupied that position for a period of two years. That is correct?

A. Yes, sir, approximately two years.

Q. Now, prior to the employment in the position that you mention with the A. T. & T. Company you were engaged in accounting and statistical work for about 25 years, as I remember?

A. The 25 years would include the time with the A. T. & T. Company.

Q. Yes.

A. Yes, sir.

Q. Your first experience in work of this kind with a telephone company was in 1910?

A. Yes, sir, at the beginning of that year.

Q. At which time you went into the employ of the American Company and were stationed in Chicago as general bookkeeper of the Chicago Telephone Company; is that correct?

A. Yes, but the American Company had nothing to do with that.

[fol. 9109] Q. Had nothing to do with it?

A. No, sir, I was hired by the Assistant Auditor of the Chicago Telephone Company.

Q. What was the Chicago Telephone Company at that time?

A. It was one of the associated companies of the Bell system, operating in and around Chicago.

Q. That was prior to the break-up of the Central Union Telephone Company and the Central Group here of Bell Company associate units?

A. Yes, it was prior to the formation of the Central Group.

Q. Was the relation of the Chicago Telephone Company to the American Company practically the same then as now, as an associate company?

A. Yes, sir.

Q. Who did you say secured your services as bookkeeper for the Chicago Telephone Company?

A. Mr. Drew, who was at that time assistant auditor of the telephone company.

Q. Had he any connection with the General Staff at that time?

A. No, sir.

Q. There was a General Staff at that time of the A. T. & T. Company?

A. Yes, there was.

Q. The same as now?

A. Yes, sir.

Q. How did you learn that the Chicago Telephone Company at that time was an associate company of the A. T. & T.?

A. By conversation with the men in the office, the other bookkeepers.

Q. Did you meet in your work as bookkeeper for the telephone, the Chicago Telephone Company, the representatives of the General Staff of the A. T. & T. in connection with your work?

A. Yes, sir.

[fol. 9110] Q. And that connection was in the nature of supervising your work, was it not?

A. No, sir, no, there was no supervision offered. It was the recommendation of accounting methods on which they had been working and which they offered for our adoption.

Q. These representatives that you speak of were from the accounting and methods division of the A. T. & T. General Staff?

A. They were, yes, sir.

Q. The same department that you are in now?

A. Yes, that is true.

Q. They were rendering at that time the same service that you render now in behalf of the General Staff?

A. Yes, sir.

Q. And these representatives you say would come to Washington from time to time and confer with you and the other bookkeepers as well with reference to the various methods of accounting and the forms of bookkeeping and arrange for the installation of their suggestions in the work of the office that you were in?

A. Yes. When I say they arranged for the installation, that does not mean that they used any pressure upon us to make the installation. They simply explained what they had, and we were free to accept it, modify it or reject it as we saw fit.

Q. Did that attitude pertain to everything that came under your notice through the General Staff? Wasn't there anything at all that the General Staff suggested there that it considered necessary, and that because it was considered necessary by the Staff, it was, therefore, adopted. [fol. 9111] A. I should say no if I understand your question properly.

Q. Now, at the time you went with the Chicago Telephone Company the American Company developed a new and a more accurate accounting system to meet the increasing demands of the business of the company, that is, the Chicago Company, as well as the A. T. & T. Company, and it was because of that, was it not, that you were brought into Chicago and put into the position, you took?

A. Yes, sir, I think that was the principal reason that they looked for an outside—the Chicago Telephone Company looked for an outside man at that time.

Q. And you did go there and you installed that system in the Chicago Telephone Company?

A. Yes, I did a considerable part of the work. I cannot claim credit for all of it.

Q. How long were you with the Chicago Company?

A. From 1910 to 1918 inclusive, I think.

Q. About eight years?

A. Yes.

Q. Prior to the time that you went with the Chicago Telephone Company where were you working?

A. I was employed by the Transcontinental Passenger Association, one of the Railway Bureaus, and my position there was accountant and cashier.

Q. Where were you located?

A. In Chicago.

Q. And that immediately preceding your going with the Chicago Company?

A. Yes, sir.

Q. How long were you in that position?

A. Seven years.

Q. And that seven years and the time you have been

with the telephone companies, beginning with the Chicago [fol. 9112] Company, constitutes the period of your work in the capacity that you are engaged now?

A. I did accounting work before that.

Q. You did?

A. Yes.

Q. Independent or with somebody or for some company?

A. I was with a company. It was a British firm, known as Henry Gaze & Sons.

Q. Located in this country?

A. Their headquarters were in London, and they had branches in New York and Chicago, and the principal part of my employment was in New York, but I was employed by them in Chicago from 1899 to 1903, inclusive. I did accounting work and auditing work and inspection work for that firm.

Q. After you terminated this connection with the Chicago Company you then were transferred to the position of Auditor of Disbursements of the Central Group of the Bell Telephone Companies, located at Chicago, were you?

A. Yes, sir.

Q. When did that change take place?

A. Let's see. I think that was 1912, the middle of 1912.

Q. What were your duties in that position, your active duties?

A. For some time after the formation of the Central Group I was the general bookkeeper and statistician of the group, and at a later date I was assistant auditor of disbursements.

Q. This Central Group included what companies?

A. The Chicago Telephone Company, the Wisconsin Telephone Company, the Michigan State Telephone Com- [fol. 9113] pany, the Central Union Telephone Company and the Cleveland Telephone Company.

Q. Did you mention the Illinois Bell Telephone Company?

A. Well, the Illinois Bell Telephone Company of today is the Chicago Telephone Company of that time. The name was changed.

Q. You are speaking of the Chicago Telephone Company in the present use of the word or term.

Mr. Burr: No, you did not let Mr. Crunden finish his answer.

Mr. Dotson: Didn't he?

Mr. Burr: No.

Q. Was there something more?

A. As I understand it the Illinois Bell Telephone Company of today is simply the Chicago Company of that time, with the name changed.

Mr. Burr: Plus the Central Union Telephone property in the State of Illinois.

The Witness: It includes more property, but as a corporation it is the same corporation with the change of name.

Q. When you were with the Chicago Telephone Company the exchange area did not include the entire State of Illinois?

A. No, sir.

Q. But today it does?

A. It does, yes.

Q. The balance of the State that was outside of the Chicago Telephone Company exchange area was occupied by the Central Union Telephone Company, was it not?

A. Yes. I do not think the Central Union occupied the entire balance of the state, but it occupied the major part of the balance.

Q. And it occupied all of the State of Indiana?

[fol. 9114] A. That was occupied by Bell Companies, yes, sir.

Q. All of the State of Ohio?

A. All of the State of Ohio except the Cleveland company.

Q. And Cincinnati?

A. And that portion of Eastern Ohio which was served by the C. & P. Company.

Q. It did not include the Cincinnati and Surburban Company?

A. Cincinnati was also excluded, yes.

Q. Now, you were located in Chicago while occupying the position of Auditor of Disbursements for this Central Group of Bell Companies?

A. Yes, sir.

Q. What was the relation existing between this Central Group and the A. T. & T. Company at that time other than

the relation that exists now between the American Company and its associates or constituent companies?

A. I do not think the relationship was any different than it is now. The five companies mentioned were brought together because it was felt that it would result in some economies so long as the companies did not grow too large. I think economy was one of the main thoughts in that.

Q. You thought it would bring about more economy?

A. I don't know. You see I was not in an executive position at that time.

Q. Do you know whether that was part of a plan or that in fact was the plan arranged by the A. T. & T. Company, that the associate companies should be grouped in the manner that they were grouped?

A. No, I haven't any information on that point, Mr. Dotson. I do not know where the inspiration came from. [fol. 9115] Q. In accordance with the operations of the A. T. & T. Company in reference to the business and operations of the associate companies it would have been perfectly natural that a plan of that kind would emanate from the American Company, would it not?

A. I think if the A. T. & T. Company felt it was to the advantage of the associated companies to go into such a plan that they would have recommended it, and in that sense it would have been entirely natural.

Q. All of the associate companies did go into the group arrangement?

A. Into that particular group; you mean the five companies involved?

Q. Yes, sir, into the Central Group, as you call it?

A. Yes, sir, they did.

And thereupon a recess was had until 1:30 o'clock P. M. of same day. (Thursday, April 24, 1924)

[fol. 9116] Thursday Afternoon Session

April 24, 1924.

And also A. B. Crunden, resuming the stand for further cross examination, continued his testimony as follows:

Cross-examined by Mr. Dotson:

Q. Mr. Crunden, in your testimony in chief you mentioned as the Central Group of the Bell Telephone Com-

panies consisting now of the Illinois Bell Telephone Company, the Central Union Telephone Company, the Wisconsin Telephone Company, and the Michigan Telephone Company and what is known as the Cleveland Telephone Company; isn't there a mistake in that, in so far as the Central Union Telephone Company is concerned?

A. Did I use the word "now"? Is the word "Now" in the record? If I said, "now" it is wrong.

Q. It is in the record?

A. There must be some outline that looks like that. The Central Group came to an end in 1919 or the early part of 1920, I think, so that I could not say it was there now truthfully anyway.

Q. If you meant it then at the time that you were transferred to the position of Auditor of Disbursements for the Central Group, then it did include the Central Union Telephone Company, but did not include the Cleveland Telephone Company, did it?

A. Originally it included both the Central Union and the Cleveland Telephone Companies, and then the Central [fol. 9117] Union was placed in the hands of receivers, and it was taken out of the group. That, I think, was in 1914. In 1919, I think it was, the group was broken up and the companies disassociated as to their management. Oh, I said consisting of what is now——

Q. But you do not want it to stand that way?

A. Yes, that is all right. I mean that what was then the group now consists of these other companies.

Q. I do not seem to get the understanding you do, but nevertheless I understand what you mean probably.

A. Yes. It is immaterial.

Q. Now, from the Central Group of the Bell Telephone Company, where you occupied the position of Auditor of Disbursements, you were transferred to Cleveland as the General Auditor of the Cleveland Company?

A. Well, I remained at Chicago. That was at the time the headquarters of the Central Union and Cleveland Companies were maintained in Chicago.

Q. You remained in Chicago but you were transferred, I mean to the position of General Auditor of the Cleveland Company?

A. That is correct, Mr. Dotson.

Q. When were you transferred to that position?

A. I think it was the end of 1919.

Q. About the time that the Central Group was broken up?

A. Yes, sir, it was at that time.

Q. Now, at the same time you were also given the position of Vice President and General Auditor of the Central Union Telephone Company?

A. About that time, yes, sir.

[fol. 9118] Now, going back to the other answer, we must be in error then in saying that you were transferred to the Cleveland Company at the time of breaking up of the Central Union or Central Group, which included the Central Union.

A. I was transferred to the position of General Auditor of the Cleveland Company at that time. I had previously been Auditor of Disbursements of the Cleveland for a number of years.

Q. That is because you held the position of Auditor of Disbursements with reference to all of the members of the Central Group?

A. Yes, sir.

Q. Each and all of them?

A. Yes, sir.

Q. But now your duties were changed when you were given the position of General Auditor of the Cleveland Company?

A. Yes, sir.

Q. You no longer rendered any service after that as Auditor of Disbursements for the Central Group?

A. No, sir.

Q. Now, you performed the duties of General Auditor of the Cleveland Company and as Vice President and General Auditor of the Central Union Telephone Company from the same office located in Chicago?

A. I did, yes, sir.

Q. These duties were performed jointly and continuously until the Central Group was disbanded and the present organization created?

A. Until the Central Union was disbanded?

Q. Yes.

A. I was there for one year. About the time I became General Auditor of the Central Union, the property in Indiana was sold to the Indiana Bell. That was just about the time I took office. Late that year, as I recall it, the [fol. 9119] Ohio Headquarters were established here and

the office force was sent over to Columbus, and shortly after that happened I left the employ of the Central Union Company.

Q. When you were transferred to offices in Columbus your relationship and position continued the same as it was in Chicago?

A. Yes, sir, for a short time. I never lived in Columbus.

Q. When was that relationship changed and to what relationship?

A. Why I left the Central Union—the Cleveland Company, to go into the employment of the American Telephone & Telegraph Company.

Q. Now, how did you secure the position as Vice President and General Auditor of the Central Union Telephone Company? Through what agency was that position created and you selected for it?

A. My understanding is that Mr. Bloom who was President of the Central Union Company made a request of Mr. Sonney, who was President of the Chicago Telephone Company, that he be allowed to approach me to see whether I would like to take a vacancy which had occurred because Mr. Pritchard, then General Auditor of the Company, was going to Indiana as General Manager of the Indiana Bell Telephone Company. And Mr. Sonney agreed to that and the proposition was made to me first through Mr. Garvey, who was General Auditor of the Illinois Bell Telephone Company. He suggested that I take it over and go down and talk with Mr. Bloom myself, which I did. And I agreed to take the position.

Q. Then after you served in thos- capacities the A. T. & T. Company called you into the employ of the General Staff [fol. 9120] at New York, where you have remained ever since?

A. No, the A. T. & T. did not call me. What actually happened was this, that Mr. Bloom asked me whether I would rather go to Ohio or go to New York, and I told him I would rather go to New York, because my father was an old gentleman, and I did not expect him to live very much longer; I would rather go to New York.

Q. Who is Mr. Bloom, you say?

A. Mr. Bloom was president of the Central Union and the Ohio Bell Company.

Q. And it was through his suggestion, you say, that you chose the position you have held with the A. T. & T. Company?

A. Not at his suggestion, no, but he asked me which I would rather do, and I said I would rather go to New York.

Q. Then you did go to New York, and took the position?

A. Yes, sir.

Q. Did you consult with anybody else with reference to it than Mr. Bloom?

A. After I had told Mr. Bloom that, Mr. Heiss, controller of the American Company, on a visit to Chicago, asked me whether that had been the conversation and whether I would be willing to work for him. And I told him that I would.

Q. Who was Mr. Heiss, the man at the head of the department you are in?

A. Yes, sir.

Q. Now, you said in your testimony in chief that when the Central Union Company was divided up "I was transferred to New York and became Assistant Chief Statistician of the American Telephone and Telegraph Company, and [fol. 9121] occupied that position for about a year, and then assumed my present duties." Then as a matter of fact your present position you did not take until you were there about a year.

A. Yes, roughly a year. But I don't remember just how long that was. Roughly a year.

Q. And in this testimony you referred to the same incident that you have just now related, of your passing from the Central Union Telephone Company to New York to the General Staff?

A. Yes, sir.

Q. You said on page 520 of your testimony that everything that the Central Union Company owned in the State of Ohio was taken over by the Ohio Bell. Does this include the Cleveland Exchange?

A. That was Mr. Burr's statement, and as I understand it, the property of the Central Union Company was sold to the Ohio Bell and the Ohio Bell as a corporation is the same as the former Cleveland Telephone Company, there being merely a change in the name of the corporation.

Q. Well then, the Ohio Bell actually took over more than the Central Union Telephone Company property in Ohio?

A. You mean down to this time it has taken over more.

Q. Yes.

A. Yes, it has taken over the C. & P. property.
Q. Where is it located?
A. The Ohio Bell?
Q. No, the C. & P.
A. The C. & P.? Why, the headquarters of the Chesapeake and Potomac Company are at Washington, and the name of the corporation is the Chesapeake & Potomac Telephone Company of West Virginia.

Mr. Burr: I may say, Mr. Dotson, that those matters to which you are now referring are matters of record with the [fol. 9122] Commission.

Mr. Dotson: I haven't any thought of pursuing that inquiry further.

Mr. Burr: Probably the records are the best evidence, but there is no objection to asking the witness on the subject also. The name of the Cleveland Telephone Company was changed to the Ohio Bell, because it was easier to take a company which was already in existence than it was to form an entirely new company, and that was the only reason which I can now recall for the fact that the name of the Cleveland Telephone Company was changed to the Ohio Bell Telephone Company, and then the Ohio Bell purchased the Central Union, rather than that a new company be formed which would purchase both the Cleveland and the Ohio Bell.

Q. Reference has been repeatedly made and the expression employed of "The Bell system" in testimony here. We are to understand that that designation includes the associated companies that have been mentioned here, I think about 25, and the A. T. & T. Company, that whole group of associated companies?

A. The term is frequently used that way. Sometimes it is used in a more inclusive sense, to include the Western Electric and the connecting companies in which the associated companies have an ownership. It is rather a loose term.

Q. In the testimony here the meeting that we are justified in giving to it is that which I have just mentioned; it includes the associated companies, consisting of about 25, the operating companies about the country, such as the Ohio [fol. 9123] Bell, and the A. T. & T. Company?

A. That would be correct as regards to my testimony, yes, sir.

Q. Then it would be fair to say briefly that the Bell system includes the associated companies so called as the operating units of the system, and the American Company, that is the A. T. & T. Company, as the executive unit of the system, exercising supervision and directing authority over the operating units?

A. No, I think that would create a radically wrong conception of the proper relationship. The A. T. & T. Company does not exercise executive jurisdiction over the associated companies, but the executives of the associated companies so far as my knowledge goes have used their own discretion.

Q. You mean that the executives of the various operating units exercise the executive duties pertaining directly to the operating business of the unit; is that true?

A. Yes, sir.

Q. Then beyond that is the executive duty exercised by the A. T. & T. Company through its General Staff in its work in behalf of the associated companies such as you have described?

A. I did not get the verb in that question.

(Question read.)

A. I do not know that it is correct to call those executive duties. They are more of an advisory relation.

Q. They have to do with the administration of the conduct of the business of the associated companies, have they not?

A. They do, but without conferring any authority to con- [fol. 9124] duct the business of the company. For instance, take my own case. I am continually in contact with various general auditors and I give them my views about what it may be desirable for them to do in my opinion. But I cannot exercise any direction over them at all and they are free to agree or disagree with me as they see fit.

Q. I am not alluding now or referring in any sense to your personal executive authority, but I am referring to the executive authority of the A. T. & T. Company which it expresses in some degree through the work and services of the Staff.

Q. You mean that the work and services of the Staff create an instrument of executive control over the local companies?

Q. In other words, the General Staff has taken over a

lot of work that by virtue of the manner in which the Bell system is organized the operating units are not prepared or equipped to do; that is true, isn't it?

A. Yes, that is true.

Q. Now, those duties with reference to the entire system are performed and discharged by the A. T. & T. Company?

A. That is correct, yes, sir.

Q. Now, those duties relate directly and vitally to the management and the conduct of the business of the operating unit?

A. They have a vital connection, yes, sir.

Q. And no other unit in the system is prepared or equipped to perform those duties other than the A. T. & T. Company itself?

A. That is correct.

[fol. 9125] Q. Now, it is true the cooperative activity of all of those units of the Bell system, that the business of the Bell system so-called is carried on from day to day and year to year?

A. Necessarily.

Q. That was evidently then the purpose of organizing the system in the manner that it has been organized and is being operated at this time.

Mr. Burr: I object to that. The purpose is to be determined from the facts.

Mr. Dotson: That is one way probably. But there are still other ways:

(Question read.)

Q. I am referring to the matters that you and I have been discussing here as the things which the various units do. Now, the manner in which those things are done was the purpose of organizing the system in the way it is organized.

Commissioner Poor: He may answer, assuming that he knows the purpose.

Mr. Dotson: I am assuming that he does.

Mr. Burr: Note an exception.

The Witness: It is natural that a system so nicely adapted to the situation could not happen by chance. It must have been planned. Of course, my knowledge as to what the people in the early days of the telephone business had in view is derived largely, for example, second hand—for ex-

ample the annual reports of the company, where the growth of the system is repeatedly explained.

Q. Prior to the effecting of the present organization of [fol. 9126] the Bell System the various units, such as the Central Union Telephone Company and others, that operated over more than one state, were subject to the Interstate Commerce Commission; that is a fact, isn't it?

Mr. Burr: Read that question.

(Question read.)

The Witness: I presume so. I would not be any special authority on that.

Q. Now, that was especially true with reference to their accounting methods of the system?

A. As I understand it, it is immaterial whether——

Q. Well, if they were subject to the jurisdiction of the Interstate Commerce Commission, they would have to comply with the orders of the Commission with reference to the system of accounting as to the interstate as well as to the intrastate business which they conducted, because they were engaged in interstate business?

A. Well, the jurisdiction of the Interstate Commerce Commission in respect to accounting, as I understand it, applies to all companies which handle any interstate business. So I do not think the situation would be changed, whether the company operated in two states or operated in one state, as long as interstate messages were handled over its plant.

Q. Isn't it a fact that the present Bell system has placed all of the interstate business in the hands of the A. T. & T. Company, and that the Ohio Bell Company is not doing any interstate business?

A. I cannot say as to that. I know cases where the associated companies are doing interstate business, of course, [fol. 9127] many of them.

Q. You do not know whether the Ohio Company is or not?

A. Doing interstate business?

Q. Yes.

A. Why I have no doubt it is doing interstate business in this sense,——

Q. How?

A. That I presume it has some calls on toll lines which go over the border. I am not positive about that.

Q. You do not operate toll lines or interstate business; that is, it has no toll lines running to Indiana or Chicago or Michigan or to Pennsylvania?

A. You mean where its own lines terminate in the other state?

Q. Yes.

A. That may be possible.

Q. Yes.

A. But they participate in a haul that begins in one state and terminates in another, as to which they furnish part of the toll line.

Q. Yes, but they are not operating any interstate business at all; they carry the messages, the service, to the state line and terminate there, and their responsibility and jurisdiction over it terminates at the state border?

A. If I understand you, that is equivalent to saying that they own no plant outside of the limits of Ohio. Is that the idea?

Q. That is the idea, and the Ohio Bell Telephone Company exercises no control over properties, telephone properties, outside of Ohio?

A. I don't know that of my own knowledge. It may be so. I know that they are principally, if not wholly, confined to the State of Ohio.

Q. Then as a matter of fact one of the purposes in organizing the Bell system in its present form was to remove [fol. 9128] or take away from the various operating units the interstate business and take that out from under the jurisdiction of the Interstate Commerce Commission and subject only the one unit, that is, the A. T. & T. to the Interstate Commerce Commission.

Mr. Burr: I object to that. I do not understand the purpose of it in the first place. The question whether or not the Ohio Bell Company is subject to the jurisdiction of the Interstate Commerce Commission is a question of law and I think it is in evidence all through this record that the Ohio Bell Telephone Company is subject to the jurisdiction of the Interstate Commerce Commission.

Mr. Dotson: This has to do with the purpose of this organization. There was evidently some purpose behind it that gave birth to the system.

The Witness: Is it your understanding that all of the Bell Companies operate exclusively within the limits of a single state?

Q. I have assumed that that probably was true, and especially true of the Ohio Bell.

Mr. Kinnison: Might I ask a question, Mr. Dotson?

Mr. Dotson: Yes.

Mr. Kinnison: Did I understand you to mean, Mr. Crunden, there were several cases when the call originating in Ohio might be conveyed to the Ohio territory line on Bell property and then relayed on to the next state?

The Witness: No, sir. That may be the case, but I do not know whether it is or not. But I do know that the Ohio [fol. 9129] Bell owns toll lines and that these toll lines are hooked up with other lines.

Mr. Kinnison: Actually used for interstate commerce?

The Witness: Yes, sir, yes, sir. For instance, I talked to my home in Brooklyn this morning.

Mr. Kinnison: Did you use the Ohio Bell line or the A. T. & T.?

The Witness: I don't know. I know that there are such lines. And, Mr. Dotson, the New England Telephone Company operates throughout the states of Massachusetts, Vermont, Maine, and I think parts of some other states, and the New York Telephone Company operates in New York and New Jersey and a portion of Connecticut.

Mr. Burr: Give some more examples.

The Witness: The Southern Bell Company operates in Florida, Alabama, Georgia, North Carolina; and the Cumberland Telephone Company operates in Tennessee, Mississippi, Louisiana; and the Southwestern Bell Company operates in Missouri, Arkansas, Texas and Kansas.

Mr. Burr: What about the Northwestern?

The Witness: The Northwestern operates in several states similarly. So does the Mountain State Company, which operates out in the Rocky Mountain Region, running all the way from El Paso, Texas, up to the Canadian line. And the Pacific Tel. & Tel. operates from San Diego to the Canadian Boundary.

Mr. Kinnison: The A. T. & T. is taking over the toll busi- [fol. 9130] ness in Ohio, is it not?

The Witness: I don't know, Mr. Kinnison, what it is doing.

Q. On page 521 in your testimony you speak of the comptroller's department performing in behalf of the associated companies what might be called the research and development work which is required with respect to the statistical, accounting and certain financial functions of the business. Do you mean by this statement that it is required by the American Company for the associated companies?

A. You mean, do I wish to convey the impression that methods which the comptroller's department conceives and develops are made mandatory upon the associated companies, that the associated companies are required to accept anything that the comptroller's department puts out?

Mr. Dotson: I think I better ask the stenographer to read the question. I think you will understand it if he reads the question.

(Question read.)

A. Required——

Q. You have used the word there "required". I say what do you mean? I want to get its proper setting.

A. The way I paraphrased it was the sense in which I understand it, and my answer is no, that is, that they do not require it in that sense. I mean the research and development work which is undertaken is work that is practical and useful and in that sense it is required. It is required by the [fol. 9131] needs of the business.

Q. Well, that is——

A. My meaning would be equally well expressed by the word "desirable" or by the words "demanded by the needs of the business."

Q. You aim to do only those things that are necessary and, therefore, required?

A. That is the idea, yes, sir.

Q. Now, it is the duty of the A. T. & T. Company, acting in the capacity that we have described heretofore, to discharge its duties of seeing to the necessities of these companies and performing that as a part of its duties as a member of the Bell system?

A. You mean their necessities in the way of the recommendation of the most efficient and economical methods, and the answer is yes.

Mr. Kinnison: Mr. Crunden, on page 533 of the record, Mr. Dotson in cross examination, in an interruption of your

direct examination, said, "The system of accounting which you have testified to was that system which the American Company desired to be observed by the associated companies." To that you said, "Yes, sir."

The Witness: Where is this? 533?

Mr. Kinnison: Yes, of your record.

The Witness: Well, my answer "Yes, sir" had reference there for the purpose of unifying the system of accounting, and I understand that your point is there that the way in which the question was phrased led me to state by inference that the A. T. & T. Company managed and operated the local companies.

Mr. Kinnison: The inference I drew was that the asso- [fol. 9132] ciated companies adopted it, because the American Company desired it. Is that what you mean?

A. No, they adopted it because it was the best system that could be devised for their use, and they adopted it because it was advantageous to them, and as to that parts which they considered disadvantageous, they did not adopt it.

Mr. Kinnison: Not because the American Company desired it?

The Witness: No. I am glad you called attention to that, because my answer in that one sentence had reference to the primary idea and I failed to catch the significance of the subordinate clauses.

Q. You also testified on page 521 that the department make complete annual audits of the general books of the associated companies including the Ohio Bell Company. [fol. 9133] The auditing of these books performed regularly by the A. T. & T. Company and not by the associated companies?

A. That is correct, yes, sir.

Q. Does the A. T. & T. Company carry a duplicate set of books of all these companies?

A. Oh, no, no, it does not by any means. In fact, I do not know that that would be permissible under the Interstate Commerce Commission Act. I think only one set of books can be kept for a public utility subject to the Act.

Q. What is the associated company required to do from time to time and at what intervals of time in placing in the hands of the A. T. & T. Company financial reports and statements of the business of the associated company.

A. The associated companies with which I am familiar make monthly reports, an elaborate series of them, and they make anywhere from fifteen to thirty copies of their reports for the use of their executives and operating officials and of the A. T. & T. Company general staff, and they send several copies of those reports each month to New York.

Q. Now the purpose of that is to fully inform, as fully as possible, the A. T. and T. Company of the operations of the associated units concerning the receipts and disbursements of the companies, which enables the A. T. & T. Company to keep a thorough check on the operating business of these units?

A. That is correct, yes, sir.

Q. And that is done for the information and benefit of the A. T. & T. Company?

A. No, it is done for the benefit of the associated com- [fol. 9134] pany too. The A. T. & T. Company could not perform its functions with reference to the associated company without being fully informed as to the financial showing, and they must receive copies of the reports if they are to discharge their obligations to the associated companies.

Q. How can it be a benefit to the associated company to be required to prepare and furnish monthly those statements? That in itself would be no benefit to the associated company would it?

A. Oh, yes, it would be a decided advantage.

Q. Wouldn't the benefit of it all be to the A. T. & T. Company up to that point?

A. No, I don't think so at all, because the American Company repeating these reports and analyzing them, obtains a certain viewpoint——

Q. Now you are talking about something subsequent to what I am. I am talking about the preparation and the filing of those reports with the A. T. & T. Company. Up to that point, there is no direct benefit derived from it by the associated company, but the benefit up to that point is for the A. T. & T. Company, so it can do something subsequent on account of it? Now that is true, isn't it?

Mr. Burr: How can it be any benefit to the American Company until they are filed with them?

Mr. Dotson: Now, Mr. Burr, we are getting along all right, Mr. Crunden and I.

The Witness: Let's see what happened. When some of [fol. 9135] these reports are struck off and some of the copies go to New York, they are right at New York in the mail. Do you want to take it at that point, before the A. T. & T. Company has seen anything of these reports?

Q. I am taking it up to that point, its arrival in New York.

A. In the office of the company? And your question here, has the fact that some copies have been transmitted to New York and arrive there and no use has been made of them so far been of any advantage to the associated company? Is that the question?

Q. Yes, that is the question?

A. There is only one answer to that and the answer obviously is no.

Q. Well, I don't want to have it appear I am trying to be anything but fair. I want to be fair and probably one might get the impression the other way?

A. Not at all. I know that could not happen.

Q. The primary purpose of these reports is, of course, to furnish the information that they carry to the A. T. & T. Company; that is the first and primary purpose of the reports, to convey this information that they bear to the A. T. & T. Company, that it may proceed to discharge its duties to the associate companies.

A. The primary object of the reports is to furnish information to the local officials. There would be bound to be such reports, even if the A. T. & T. Company never existed. As to those copies that go to New York, of course the primary purpose there is that the A. T. & T. can analyze them and advise the associated company as to trends and as to their opinion of results in such a way that the associated [fol. 9136] company can get the benefits flowing from that.

Q. Now what kind or sort of books and records does the A. T. & T. Company keep with reference to the associate companies, the business of the associate companies?

A. It keeps none whatever.

Q. Does it have any records of the business of the associate companies beyond the financial reports, monthly financial reports?

A. No, sir, except such as are purely incidental, as for example, when toll studies are made, it reveals not merely the business handled over the A. T. & T. lines, but also the business handled partly over A. T. & T. line, which was also

handled on the lines of the associated companies, but I take that to be a mere incidental matter for the purpose of your question.

Q. You have spoken about preparing a uniform system of accounting, that is, by the A. T. & T. Company, for the associated companies. As a matter of fact, the only thing that the A. T. & T. Company has done in that respect has been to see that there has been installed and used by the associated companies the same uniform system of accounting as recommended by the Interstate Commerce Commission, and to have those associate companies conform to that system?

A. Well, I do not think that would fully state it.

Q. No?

A. If you want to state it very compendiously, I think you would state it this way: Prior to the adoption of the uniform system of accounts, the American Company perfected the best system it could for the use of the associated companies, [fol. 9137] but when the government intervened and began the study of a system which was to be mandatory, the American Company performed the necessary work with the government in behalf of the associated companies, and relieved those companies of the work which otherwise they would have had to do or let the thing go by default. After the system became effective, the American Company worked out those optional sub-accounts and detailed classifications, which were not made mandatory by the uniform system of accounts, and gave the associated company the best suggestions that it could on that; and from time to time it has answered the inquiries of the associated companies with reference to classifications and where necessary has taken those inquiries to the Interstate Commerce Commission and obtained definitive answers; and that work as I said before is still going on.

Q. Granting all that, yet the system of accounting that the associated companies employ is constantly that recommended by the Interstate Commerce Commission?

A. The main backbone of the accounts is fixed by law, yes, sir.

Q. Now, in a question asked by Mr. Burr which you answered, this was said: "Will you tell the Commission whether or not the services which you have been describing and are about to describe are services furnished by the General Staff of the American Telephone Company, par-

ticularly by the department which you are referring to", which evidently was your department, "From time to time [fol. 9138] for the benefit of the associated companies, including the Ohio Bell." Your answer was, "I understand; I will talk with reference to that work specifically and I shall have that work in mind in what I say." Now, having in mind your testimony as to the work performed, which you describe as performed by the A. T. & T. for the benefit of the associated companies, including the Ohio Bell, to what extent do you consider these services are also of benefit to the A. T. & T. Company?

A. Why, they are only of benefit to the A. T. & T. Company in this way, that efficiently performed they entitle the A. T. & T. Company to receive compensation for the services.

Q. The A. T. & T. Company owns the stock, the common stock, of the Ohio Bell Telephone Company; we understand that is true isn't it?

A. Yes, sir.

Q. Wouldn't it occur to you that as owner of that stock, which is the basic ownership of the property that there would also be reflected very strongly an interest, a proprietary interest as well, that would be conserved by these services?

A. No, that would not occur to me. For example, I am a stockholder in the Crane Company, but I do not perform any services for it.

Q. No, but in a case like this that we have before us of the Bell system, there exists this complete ownership of a property, such as the Ohio Bell property, and the A. T. & T., the owner of it through its stock holding, is rendering services to that company; wouldn't the proprietary interest occur to your mind as a very important interest as being [fol. 9139] served by that service.

Mr. Burr: I object to the question. It assumes something which is not true in point of fact and is controverted by the record, namely, that the Ohio Bell Company is owned by the American Company.

Mr. Kinnison: Mr. Burr is distinguishing between the outstanding preferred stock and the common stock.

Mr. Dotson: I understand. I make the decision and I am only referring in the question to the common stock holding.

Commission Poor: Well, there is the question as to the common stock.

Mr. Dotson: I am asking about his state of mind with reference to the benefits which are derived from these services.

Commissioner Poor: He may answer.

The Witness: No, that would not suggest any such result in my mind. It seems to me that the mere fact of ownership of the common stock of the corporation does not entail the necessity of rendering any services, and it seems to me particularly in a case like this that the services rendered should be paid for, and not rely upon philanthropy or anything like that to secure the services.

Q. I have not suggested that, Mr. Crunden. I have only suggested the fact that certain interests are being served by these services which are rendered. There is the operating interest and here is the proprietary interest coupled with it, [fol. 9140] which makes the operating interest possible. Wouldn't that benefit in your mind now the reflected fact to the proprietary interest that is vested in that property?

A. No.

Q. The fact, Mr. Crunden, that the owners of the common stock of the company, the Ohio Bell Company, should receive dividends from the profits and earnings of the company when such profits and earnings are available and are the ones that directly are benefited from the net earnings and profits of the company does not change your mind at all and your view of the question of benefits that result to the owners of the stock from the services that you claim are rendered by the A. T. & T. Company for the Bell Company?

A. No, my idea on the subject is simply this. Let us take a corporation in which I, as an individual might own a small amount of stock. If they would come to me——

Q. I do not want to interrupt, but the question is in point here, and I would like to have the answer in accordance with the question or else require another question directing your attention to another thing?

A. All right, strike out the remainder of the answer after "No". I want to give Mr. Dotson what he wants.

Mr. Burr: You have a right to explain your answer. The Commission ruled you have answered the question.

The Witness: I was simply going to say if I were the owner of a small amount of stock in the corporation and the officers of that corporation came to me and said, "Here, [fol. 9141] you can do us a little incidental service in the

corporation by going and seeing somebody or doing something," I would very likely do it. But if they came to me and said, "Here, we want you to do certain continuing work, certain work that is more than incidental," I would say, "I will see about that." And the first thing I would ask them would be how much they were going to pay me for that work.

Q. You do not consider that a parallel case to the one on hearing now?

A. I think that applies to any place, where one individual does work for a corporation.

Q. You think it applies in this case?

A. Yes, I do.

Mr. Kinnison: Would you be willing to sit on the board if you owned 90 per cent of the common stock?

The Witness: Sit on what?

Mr. Kinnison: Sit on the Board of Directors, and perform the services of a member of the Board, give your best judgment.

The Witness: If I was elected a Director of the corporation, the corporation to which I referred, and accepted, then I would do my duty as a director and I would be compensated as a director.

Mr. Kinnison: You do not distinguish between a small ownership and a 98 per cent ownership as regards the ordinary duties of the two parties.

The Witness: No, not if I understand your question correctly.

[fol. 9142] Mr. Kinnison: You said in answer to Mr. Dotson if you owned some stock, any small proportion of the stock of the corporation, you would perform gratuitously some services, but if they called upon you for steady duty, you would expect to be paid.

The Witness: Precisely.

Mr. Kinnison: On the other hand would your opinion be the same if you owned 90 per cent of the stock of that corporation instead of a small amount of it.

The Witness: Exactly the same. I would be fooling myself if I took any other position.

Mr. Kinnison: You do not think your responsibility would be any greater in one than in the other.

The Witness: No, not as a stockholder.

Q. Laying aside all arguments and views which have been expressed, you do recognize though, Mr. Crunden that such services as you have related here that are rendered by the A. T. & T. Company to the Ohio Bell Company, if rendered, do result in a benefit ultimately to the stockholders to the extent of any dividends which they may derive on their stock; isn't that true? That benefit can be traced back as one of the results of the services rendered?

A. That rather long sentence remains in my mind this way; that if the contract is beneficial to a corporation, it is beneficial to the stockholders who own the corporation. That is obvious.

Q. To the extent that they derive—At least to the extent that they derive a dividend return upon their stock. That [fol. 9143] is one benefit.

A. I don't think you can particularize about that. The proposition is that anything that is beneficial to the corporation is to the advantage of the owners of the corporation. That stands to reason.

Q. Now, you and I agree on that?

A. Yes.

Q. If that service results in maintaining a value to the property, that is a benefit to the owner is it not? If it maintains the value of the property and the use of the property to which it is devoted, it is a benefit to the owner isn't it?

A. Yes, I would say so.

Q. If it also enables that property in that use to provide an income or a return in the way of earnings and profits to the owner, the owner is benefited.

Mr. Burr: It is wholly a matter of argument. I do not see that we are getting anywhere with it.

Mr. Dotson: It should not be and it is not if we can find out how we look at those things.

Commissioner Poor: The mere fact that it may be beneficial to the stockholder does not make it any less beneficial to the company.

Mr. Dotson: Well, granting that is true, yet it is well to know what this witness regards as benefits flowing from these services, to the company.

Commissioner Poor: The fact that it may benefit somebody else other than the company does not in itself imply it is not beneficial to the company.

Mr. Dotson: That remains for discussion later on Your Honor, that I think will be helpful to the Commission.
[fol. 9144] Mr. Burr: You are trying to discuss it now through the medium of this witness, and that is my objection.

Mr. Dotson: No, I am trying to get at what this witness means by the things he said.

Q. Now, Mr. Burr, in a question here you said, "Now if it can be understood that all of these services to which you are testifying are rendered to the Ohio Bell Company among others, it will shorten the inquiry. With that understanding will you please proceed?" and you said, "Yes." You then testified as to what you considered and claimed to be the services rendered by the A. T. & T. Company. Now did you mean while you were testifying that the Commission and the parties interested in this hearing were to understand that all the matters mentioned by you in your testimony were received by the Ohio Bell Company, and that the Ohio Bell Company was thereby benefited?

A. In principle, yes, that is, I might have illustrated by means of some details that would be more specifically to some other company than the Ohio Bell, because I am not familiar with the Ohio Bell. But in either one my answer is, yes.

Q. Now, you are making that statement not upon the basis of the fact of whether the services that you described your department rendered were received and used by the Ohio Bell Company or not?

A. I fail to get the sense. Will you read it?

(Question read.)

Mr. Dotson: Just strike it out.
[fol. 9145] The Witness: Would you mind putting it some other way.

Q. Your statement is made without regard to the fact that probably many of the services described were not received and used by the Ohio Bell Telephone Company?

A. No, I think that all of the services that I testified to in a general way are received by the Ohio Bell Company. But I merely meant this, that I do not remember exactly what I testified, and I may have used some illustration of a service rendered that might not in the form in which I made it, apply to the Ohio Bell. It might apply in a general-

ized way, but not in a specific way, because I did not confer with the Ohio Bell Company before I came out here. So that, disregarding that minor proposition, the answer is yes.

Q. You do not mean to say to the Commission that you are able to testify from personal knowledge as to what portion of these services were received and used by the Ohio Bell Telephone Company?

A. In a general way I am, yes, sir.

Q. Now, in what way? When you say, "A general way" just what do you mean? In what general way have you personal knowledge? I am speaking about personal knowledge.

A. Of course I have personal knowledge of the affairs of my own sub-department, and I send men to Ohio to perform work for the Ohio Bell Company, assisting them in the installation of routines and in various other work. And I answer correspondence and my subordinates answer corre-
[fol. 9146] spondence from the Ohio Bell Company.

Q. But that does not cover all of the services rendered by your department does it?

A. You mean the whole of the comptroller's department?

Q. That renders these services that you have described, I mean.

A. No, I am using that as an illustration.

Q. That is as far then as you can state that your personal knowledge goes with reference to these matters?

A. My personal knowledge goes rather intimately to my own particular section of the comptroller's department, and it extends generally to all of the work done in that Department, because I am more or less closely in touch with all of the sections.

Q. Now turning to another subject, with reference to Exhibit Number 6, Crunden Exhibit Number 6——

A. What is the name of it?

Q. "Standard estimate routine of the Bell Telephone System." On page 20, paragraph 12, it reads, "Interest during construction on account of construction work in progress, estimates should be determined monthly by applying the authorized rate to the balance account, 104, as shown on each estimate ledger sheet or open specific estimates, after the current month's transfer to fixed capital account has been made, and the amount so obtained should be posted to the column headed, 'Interest during construction, monthly

charges.'" Are those authoritative accounting instructions actually in effect among the associated companies?

A. Yes, sir.

[fol. 9147] Q. Now the amount that is so posted and charged may or may not correspond to interest actually paid by the treasurer of the company to a lender of the money to the company on account of particular dollars paid out on account of the specific estimates involved, does it?

A. It may or may not.

Q. In what way may it not?

A. In almost all cases, you would not borrow money for use on a particular specific estimate. You would have capital which you were proposing to invest in a property, and this entry to which you have just referred is simply book recognition of the principle that interest during construction is an item properly to be capitalized. But we make no attempt to capitalize in any one year the exact sum that we might capitalize in that year if we made an attempt to capitalize the very last item of property that was subject to interest. We simply place that amount on the books in recognition of the general principle that interest is an item properly to be capitalized during construction, and we capitalize interest only on specific estimates.

Q. This interest is charged to the construction account monthly is it not?

A. Yes, sir.

Q. And without regard to the source of the funds that are used for construction?

A. That is correct. We obtain money—That is, the Ohio Bell Telephone Company obtains money on advances; it might obtain money on bonds. However the money were gotten, you would make this particular entry in the same way.

[fol. 9148] Q. In the construction work, it is a fact, that you use the funds in the depreciation account to the extent that you have funds there available for that purpose; that is true, isn't it?

A. We have no funds in the depreciation account.

Q. Well, you have a depreciation account haven't you?

A. Yes, sir, we have a liability account as I explained on my direct examination, known as the reserve for accrued depreciation. That is a book account, but there is no fund associated with it.

Q. In making up your financial statements of revenues

and expenses, you show in those statements, which reflect the records of the books of account which are kept, a depreciation charge, do you not?

A. In the operating expenses, yes, sir.

Q. And that depreciation charge represents an amount that is taken from current revenues to cover the amount that is placed in that fund?

A. No amount is placed in any fund.

Q. Well, I mean this, to be particular; the company say has a revenue of $500,000.00 total revenue for the year. Now at the end of the year the disbursements for maintenance are so much, for traffic so much, commercial so much, interest a certain amount, taxes a certain amount, depreciation a certain amount, rents a certain amount, and any other expense that goes in. The various funds thus created are created from the revenues aren't they, from which are made the items carried into the expense account?

[fol. 9149] A. As I understand it, you mean that the charges to the depreciation expense operate to retain in the undertaking amounts equivalent to the charges, so that they cannot be disbursed in dividends or otherwise pass out of the business.

Q. Yes?

A. I agree with that.

Mr. Kinnison: What is your answer?

(Answer read.)

Q. You mean when you say there is no money in the depreciation account simply that the company uses available funds derived from the incomes of the company for all of the operation needs, including construction of additions and extensions and betterments, as well as cost of maintenance and so forth, so that at the end of the year, there is actually no money in existence that can be parceled out to those funds?

A. Exactly.

Q. Nevertheless, there was just as much of a depreciation fund derived from those funds as there was a maintenance fund in the history of the operations of the company?

A. The idea of a fund seems to be that there is inevitably associated with the depreciation reserve charge an amount of cash or other assets which constitute a segregated fund. No such thing takes place. In fact, it is perfectly conceiv-

able that the depreciation charges might be made in the absence of any revenue to offset them.

Q. You treat your depreciation fund just the same as you treat your maintenance and your traffic fund do you not in operating and conducting the business of the company, [fol. 9150] that is, you have incomes from certain sources; they come in and you use them for all of these various purposes, as you go along. Now we do know and you recognize if you do actually pass any money over into the depreciation fund so-called and say, "This money belongs to the depreciation fund," that that money would be available for improvements, extensions and betterments of the property of the company, wouldn't it?

A. In that event, yes, sir.

Q. Now without going through that formality, however, you have made up your maintenance cost at the end of the year from the amount of money that you spent for maintenance; that is true isn't it, that your records are so kept?

A. You mean for current maintenance?

Q. Yes?

A. Yes.

Q. You also carry in it as the total of traffic cost the amount of money that during the year was spent in running that department; you get that; now the same with the commercial and so forth, the others that I mentioned. Now as to doing all of that you still would have a certain amount of revenues left, and you give the depreciation fund credit for some of those funds, and thereby, so far as the bookkeeping is concerned, you have absorbed such portion of the revenues as you charge to the depreciation reserve, haven't you, just the same as you will absorb in the maintenance cost a certain portion of the funds, of the revenue?

A. You say credit depreciation fund with this amount.

Q. Yes, I said charge, but I meant credit?

[fol. 9151] A. No. I think you were all right. You said credit the depreciation fund with the amount for depreciation for the year and charge that to depreciation expense.

Q. If you have used it——

A. You are using the term, "Reserve fund" there to cover what I call the reserve for accrued depreciation.

Q. If I am confused——

A. I think that is where the confusion comes in. That is, the credit entry is made to a liability account called the reserve for accrued depreciation, and it represents a book-

keeping balance that is a credit, and there is no money associated with it all all, any more than there is with any liability. Offsetting all of the liabilities in general are all of the assets in general, and that is the only statement you can make about a set of books like that that is true.

Q. I mean the depreciation fund, whether it is accrued depreciation or whether it is realized depreciation?

A. When you refer to the depreciation fund you want me to understand what is shown in the accounting system as reserve for accrued depreciation?

Q. Yes?

A. We are together on that. That is all right. I wanted to be sure that there was no confusion between us, because a fund—The word "fund" is used by accountants in a different sense.

Q. When I say fund, I mean the item known as depreciation?

A. Reserve?

Q. Yes. Whatever amount is carried by the bookkeeper into the depreciation account of his bookkeeping, the com- [fol. 9152] pany treats that as available for capital investment?

A. Well, the bookkeeper does not touch the assets of the company. He simply makes an entry that charges the expense and credits the depreciation reserve. Now whatever cash there is in the business is not changed by reason of that entry. The executives can take whatever working capital they have from the revenue or any other source, and they can direct the investment of it in plant or elsewhere, whatever they want to do, but that does not affect the question of depreciation account from the standpoint of the accountant.

Q. But the time does come in your operations that you have built certain extensions to the system which require additional capital. Now that additional capital must come from certain sources. It may come from the sale of stock; it may come from the borrowing of money; it may come from a surplus that you may acquire; it may come from depreciation account that is kept. Now, when you have no available cash capital from the sale of stock and none from the borrowing of money and none from surplus, and you take it from the depreciation account, the time comes when the capital account will have to be charged with the

amount of the extensions that are made from the funds taken from the depreciation account; isn't that true?

A. It is not true, in this way. This is where we are not describing it in the same way, that is, it is not taken from the depreciation account. It is taken from the company moneys. Now that money, along with all other assets in [fol. 9153] general, is offset on the books of the company by all the liabilities in general. But you cannot pick out certain dollars and say, "These monies or this plant is offset by reserve", any more than it is offset by capital stock.

Q. I understand, but in your bookkeeping system you do keep an account of these funds under those heads and under those items. Now those funds are used. Primarily we understand the depreciation account is to replace retired or worn out property?

A. Not to replace property.

Q. To restore capital account?

A. That is right.

Q. Yes, capital investment. But in the meantime, until it is charged off of your books in that way, the fund is there, available for any purpose of the company, and is used as I say, for working capital from time to time as a matter of fact.

A. If I can state it my way, monies which have been retained in the business for reasonable depreciation, may be used for capital additions and betterments or any other proper corporate purpose.

Q. Well, now, I am speaking about capital investment?

A. Except of course, to pay dividends.

Q. You cannot use it for that? You recognize it can be used for capital investment?

A. Yes, sir.

Q. And it is used by the company as a matter of fact; that is what I am getting at?

A. Oh, yes.

Q. Well, now, when it is used for capital investment in the construction of additions and extensions to the plant, where it necessitates carrying a construction account, the company carries this interest charge against the use of [fol. 9154] those funds just the same as if the money had been borrowed or the same as if it had been secured from the sale of stock?

A. There is no identification of dollars, so that whatever

practice obtains with reference to interest during construction applies in general. You understand of course, that the entries we make with reference to interest during construction do not apply to all of the plant which is added to our fixed capital accounts, but only to a certain amount of such stock, which is capitalized and which remains more than one month in construction progress.

Q. When that is done the company as a matter of fact is then deriving an additional benefit from the depreciation funds in the way of increased capital account upon which stock may be issued to the stockholders by way of an increased value of capital represented by the stock; isn't that true?

A. You draw that inference from the fact that entries are made covering interest during construction, Mr. Dotson.

Q. Yes?

A. No, that is not true, because what is done with reference to interest during construction is this. The ordinary method that was contemplated years ago of capitalizing interest during construction was to set apart the funds that were needed for construction in a bank where they would draw interest or something like that at three per cent, and to capitalize the difference between such interest as you could get in that way, and the amount you paid for the money, what you might call the loss on the money. [fol. 9155] That is all right with reference to large projects that occur only once in a while, as when you are building an extension or where you have additions to property going along continuously, and where you do not have these proceeds of large bond issues to draw upon it is much better as a practical matter, and it is also better from an accounting standpoint; if you make an entry where you charge plant with such interest as you propose to capitalize and credit interest revenue, that does not change the essential nature of the transaction. The essential nature of the transaction is this, that your interest during construction account shows so much debit for interest, and this item for interest during construction is a credit and a partial offset to that debit, and the result is just as if you had set out the interest account net as you would have done in the old days. I cannot see that that has anything to do with the amount of capital stock you might issue.

Q. Granting that the method is pursued that you have described, the benefit derived, however, is solely the benefit of the company, not the users or the persons who furnished the depreciation funds; it would be only the company that would benefit by that interest accrual on deposits, which give them that much more to do business on?

A. Yes, but your point was it would enable you to increase capital stock.

Q. Yes?

A. I fail to see how capital stock would be increased otherwise than the issuance of stock at par.

[fol. 9156] Q. If you capitalized the entire construction account, which you do finally, don't you?

A. We put it on the asset side of the balance sheet.

Q. When the work is completed, it is a capital account?

A. Yes, that is added to the fixed assets.

Q. Whatever went in is capitalized? If interest went in, it is capitalized along with the other items of expense?

A. Yes, but that is a different thing from saying you should increase capital stock by——

Q. Does that increase the capital investment?

A. It increases the fixed capital account in the assets, but it does not have anything to do with the capital stock outstanding.

Q. It may not and it may; if it has increased the capital investment there may be stock issued against it may there not, as a matter of financing?

A. No, I don't see how that could happen.

Q. Well, it is capital account anyway and it represents the investment of the company?

A. Yes.

Mr. Kinnison: Does it increase your physical properties for the sake of rate making?

The Witness: Which? The inteerst during construction?

Mr. Kinnison: No, pardon me. The money which the company is in a position to put into additions and betterments from its depreciation reserve; it is used as a basis for earning is it not? Used in the business of the company.

The Witness: The company seeks to earn upon the fair [fol. 9157] value of its property.

Mr. Kinnison: And by reason of your depreciation reserve you have available from your gross revenue money

which you are able to put into the plant account, that is, you expand and develop physically; doesn't physical property come into the appraisal when you seek to use it as a rate base?

The Witness: Yes, certainly.

Mr. Kinnison: And you earn upon it.

The Witness: Yes, but we earn upon the fair value of that. That is a distinct quarter section from what Mr. Dotson and I have been talking about.

By Mr. Dotson:

Q. Yes, but that is an element that enters into the value of the property does it not, the element that Mr. Kinnison spoke of?

A. How is that element described, so that we may know what it is?

Q. It enters into the consideration in determining the value of the property upon which the rate shall be based.

A. Now to bring the question and answer together, that is what I understand, that the company had certain property against which for example, we will say, it has issued capital stock. Now it does business, it performs certain services, it receives certain revenues for those services. Against those revenues it makes charges with respect to accrued depreciation. Certain moneys are retained in the business of those depreciation charges. They are part of the moneys the company receives rendering service and are therefor- the company's money, and the company may at [fol. 9158] this election extend those monies for additional property. If it does, it places those additions and betterments at the same rates that it did the original property. Both depreciates. And if it comes to a rate case proposition, it is entitled to ask for a return on the fair value of that property as a whole, and only upon the fair value.

Q. That is what it does, that is true; but the amount of money invested, the amount of money invested in plant extensions and plant growth from the depreciation reserve —And I use that word in order to know what part of the incomes we are including in our question, it is as a matter of fact, added to the value of the property upon which a rate of return on all service is asked?

A. Over and above what the amount would have been had it made no depreciation charges? Is that the idea?

Q. No, the idea is just what I mentioned, that when you build plant extensions, you necessarily increase the value of the property—Assume you do—upon which you are entitled to a return. Now, for instance, you have got a property worth $10,000,000.00, and you increase the property to fifteen million; then you would claim your rate base was fifteen instead of ten, and it might materially affect the amount of the rate that you would ask for. Now, if that additional five million is from funds which were derived from the service that you have already rendered, then you have increased your capital investment, not your capital invested by the owners of the property, but by the users of [fol. 9159] the property; isn't that true, that you have taken it from the depreciation account?

A. The investment is one thing. Now a minute ago, we were talking about what property we would have in a rate case. Now, we do not want it confused about what is on the books by way of investment and what there is for a rate case. If all you mean by your question is this, that here is certain property on the books before any depreciation charges are made, that as a result of depreciation charges there is additional working capital owned by the company appearing among its assets, which it can use for additions and betterments, without the necessity temporarily of floating additional capital stock, the answer, of course, is yes. That is obvious.

Mr. Kinnison: May I ask a question, Mr. Dotson?

Mr. Dotson: Yes.

Mr. Kinnison: I think in your cross-examination, which was in part on your direct, by interruption, you took as a typical example a thousand dollar automobile; you gave it a life of four years; you set aside to your depreciation reserve $250.00 a year using it as an analogy to show that at the end of four years, you would have a thousand dollars for your automobile; do you remember that?

The Witness: Yes.

Mr. Kinnison: Take that yearly $250.00 which you set aside and re-invest it in your business and earn $25.00 a year each year, at the end of four years, you would have your thousand dollars plus a hundred dollars, wouldn't you?

The Witness: Yes.

[fol. 9160] Mr. Kinnison: Then you would have more than was necessary to replace the machine.

The Witness: If you earned at that rate.

Mr. Kinnison: Under the statement you have just given haven't you by your re-investment of monies withheld by the company into your capital account earned upon it and at the end of the period which you have fixed for the retirement of a piece of property or the end of its life, don't you have in your possession more than enough money to take care of it.

The Witness: No.

Mr. Kinnison: Why?

The Witness: Because the system of accounts——

Mr. Kinnison: Pardon me.

The Witness: Under which we are working and which are made effective by the Interstate Commerce Commission, requires we shall make the charges according to straight line procedure, and it makes no reference to interest, and it would produce erroneous results if the interest item were included in it.

Mr. Kinnison: If you will aid me by forgetting that theory—The account system is just as foreign to my knowledge as it can be—Actually if you set it up and earn in terms of dollars and cents, actually there should be more there than the thousand dollars at the end of the four years?

The Witness: Why should you do that?

Mr. Kinnison: Just answer my question, please. You [fol. 9161] have stated that you earn on it, and if you are permitted to re-invest it in your business, you earn on it; you can use it for a new rate base; at the end of four years, assuming you have earned on it, you will have more that four $250.00; you will have four $250.00 plus the earning.

The Witness: That will depend on what you earned on the original automobile.

Mr. Kinnison: Surely, but actually at the end of the four years, you would have more than the thousand dollars?

The Witness: Not necessarily.

Mr. Kinnison: Why not?

The Witness: Because this thousand dollars is something you are providing to cover the retirement of the automobile. If you provide that, that is all you need. That is a transaction in itself. Now, if your earnings be greater or less at the end of the fourth year than they were in the

first year, that is a proposition that will speak for itself. Those revenues will speak for themselves, whatever they are, and should be so considered, whatever the revenue is. You can't change that.

Mr. Kinnison: That would affect the physical depreciation of the property?

The Witness: No, it has nothing to do with the physical depreciation of the property except it is the consumption of the property in operation that makes necessary the charge to operation.

[fol. 9162] Mr. Kinnison: As an accounting proposition you say you do not have the actual funds represented by your depreciation reserve in terms of dollars set aside. Assume we do take that procedure. At the end of the first year we set aside $250.00 without interest, the same at the end of the second, third and fourth; at the end of the fourth year, we would have a thousand dollars?

A. Yes, sir.

Mr. Kinnison: Say, however, I put it out at interest or say I invest it and earn on it, there would be an actual difference wouldn't there?

The Witness: Yes, you would be likening it roughly to what would be equivalent to a sinking fund provision.

Mr. Kinnison: You do receive some benefit then by reason of your right to re-invest in the business; that is, your money is not idle; it is available to you as working capital would be, but not available for dividend purposes?

The Witness: Oh, yes, certainly. We should be very foolish if we allowed that money to lie idle, and the upshot would be an inevitable loss.

Mr. Kinnison: If you actually handled the dollars at the end of four years you would have more than is necessary to buy that new automobile you speak of.

The Witness: No, that is where the misunderstanding comes in. You are starting out on the theory that you are going to provide a thousand dollars to retire an automobile plus certain earnings, which we will say for sake of [fol. 9163] argument is a hundred dollars. Now you are going to provide that automobile eleven hundred dollars according to your layout.

Mr. Kinnison: No, I did not want to do that. I was simply taking your analogy of a thousand dollar automobile with a life of four years, straight line depreciation on it,

setting aside $250.00 a year. I was not contemplating any earning. I was simply contemplating having the new automobile at the end of four years. Wouldn't I have that much more if I set aside the $250.00 and put it out at interest?

The Witness: That will depend on whether you have been able to earn the return necessary to keep your capital whole, the return considered on the original automobile.

Mr. Kinnison: That would be taken into consideration on the original property.

The Witness: You cannot divorce this from the original property which the depreciation is designed to protect.

Mr. Kinnison: You would say you would have nothing more than necessary to take care of the depreciation on the thousand dollar automobile?

The Witness: Yes.

Mr. Kinnison: That is all.

By Mr. Dotson:

Q. Mr. Crunden, you just used an expression that you also used on page 594 of your testimony in chief, concerning your interest calculations, which you said would pro- [fol. 9164] duce an erroneous result. That related to an interest calculation on the depreciation account.

What did you mean by, "Erroneous result"?

A. I mean by that, this, that the bookkeeping is carried out according to the method of the Interstate Commerce Commission, and that is the straight line method. That makes no reference to interest charges and requires none. It is a simple procedure of spreading the cost of capital used up in operations in equal installments over the service life of the property consumed.

Q. Briefly, when you say an erroneous result, you mean it would produce a result contrary to that which the straight line would produce?

A. Yes, and an erroneous result as far as the prescribed accounting is concerned.

Q. Well, if I understand your answer that is just the same thing I mean?

A. It is something more than what you said.

Q. It is contrary to the method adopted by the Interstate Commerce Commission and of course to that extent it would produce a different result, and therefor it would be errone-

ous, because it is contrary to that method and contrary to the result which that method produces?

A. Yes, and it is to be condemned because it produces an erroneous result and not because it produces a different result.

Q. But you do not mean that interest could be—That is, an accountant could properly compute interest return upon that depreciation account, which to that extent would in-
[fol. 9165] crease the depreciaton account and thereby augment it more rapidly than the straight line method would?

A. What would be the object of augmenting it more rapidly. If you augmented it more rapidly——

Q. That could be done could it not?

A. It could not be done under the prescribed system of accounts.

Q. Not under the straight method, but it could be done under any other method?

A. I would not like to undertake the task of doing it, because it would be exceedingly difficult to get it accurate.

Q. Isn't there a method that does contemplate interest return upon these funds?

A. No method that is in general use.

Q. I don't mean in general use. But I say there is a known method by which that is done?

A. There is a known method by which it is presumed it may be done as a mathematical possibility, but it does not work out in practice.

Q. Is that a feature of the percentage method? Isn't there a method called the percentage method?

A. The diminishing percentage method?

Q. Yes, the diminishing percentage method I should say?

A. I have heard of such a method. I never knew anybody that used it, and it is not equitable for use by public service corporations.

Mr. Kinnison: It is not what? Equitable, you say?

The Witness: It is not equitable.

[fol. 9166] Q. It is a method that is known and it is a workable method as well, but probably not a convenient one; isn't that true?

A. Any method would be workable. You could chop the amounts which in the aggregate make up the consumable capital outlay into any size portions you want and shove

them in in any old fashion, and the thing would be workable in that sense.

Q. Now there is a sinking fund method that contemplates interest, too, doesn't it?

A. Yes, sir.

Q. Is that used?

A. No, sir. It is used in a few cases by street car companies I believe where it is required by the provisions of some contract, and in some cases those contracts were made years ago before all of the features of the sinking fund method were properly understood. I don't think there is any telephone company in the country that uses or could use the sinking fund method.

Q. Your sinking fund method is objected to, I assume, because it is rather a complicated method and not simple like the straight line method?

A. The primary objection to it is it is not a lawful method.

Mr. Kinnison: What do you mean by that?

The Witness: Our position on that is explained in our brief which we placed before the Interstate Commerce Commission at this hearing on depreciation this year.

Mr. Kinnison: You mean to say that the A. T. & T. claims it is not lawful.

The Witness: It is not a lawful method.

[fol. 9167] Mr. Kinnison: You mean that is your contention?

The Witness: Yes.

Mr. Kinnison: I see.

The Witness: We do not see how it can possibly be made to work. Of course on top of that, there are insuperable practical difficulties.

By Mr. Dotson:

Q. Then there is the compound interest method?

A. The compound interest method I presume is what I would designate the annuity method.

Q. Yes?

A. I would not call that a method. I would call that a theory. It is worse than useless.

Q. It has been used, as it not?

A. I do not believe it has even been used in practice. It might have been ventilated in the brains of some mathematicians where everything down to the end of time is given eternal space, but it could not be applied in practice by fallible humans.

Q. At least, it is a method that is discussed in all standard authorities on depreciation accounts is it not?

A. I would not say in all. It is adverted to in some. And it is discussed and condemned by the Interstate Commerce Commission depreciation section in its report.

Q. Yes, we understand the stand of the Interstate Commerce Commission, because it is defending its own straight line method. Now what is the unit cost or rational method? Is that different from any of these others you have mentioned?

A. The unit cost or rational method?

Q. Yes?

A. That is a new one.

Q. There is such a method is there not?

[fol. 9168] A. I never heard of it, Mr. Dotson.

Q. Then you would not be able to discuss it or define it?

A. No, sir, I don't want to meet any more methods than I am acquainted with already.

Q. I guess I will have to tell you about it. I won't now though. Now on Page 586 of your testimony you discuss the depreciation account, and in that connection I wish to ask, should the original cost of a piece of apparatus as reflected on the books of account include any items of cost other than that covered by the actual original expenditure required to put the piece of apparatus in position and in service?

A. You mean should the charge to expense include anything other than the book cost of that item?

Mr. Dotson: I think maybe we better have the question read.

(Question read.)

The Witness: Not unless additions are made to the structure at a later time before its displacement, that is, it might be a property that grows as it lives.

Q. I do not know that I full- catch the significance of that statement?

A. It might be a useless interjection as far as your pur-

pose is concerned. Here is a switchboard that is placed on the books at ten thousand dollars originally. Now the object of the bookkeeper is to charge off that ten thousand dollars in equal installments during the life of that switchboard. But additions will be made to that switchboard during its life, and as those additions are made additional [fol. 9169] amounts arise which must be written off in a similar manner. But the book will always be on the basis of cost; if that is the general trend of your question, the answer is yes.

Q. Only that part which it cost to put it in service?

A. Yes.

Q. Now, how do you determine the service life of a property or a class of property?

A. You mean how does the company determine the service life?

Q. Yes?

A. According to the Interstate Commerce Commission accounting system the duty of doing that is placed upon some responsible officer, who must be ready to support his conclusion if necessary under oath. That officer in most of the Bell Companies is the chief engineer, although not always, I think. It is an engineering question.

Q. Is that determined by the physical life of the property?

A. You say is that determined. Is what?

Q. Is the service life of the property determined by the physical life, in other words, the physical existence and usefulness of the property?

A. I better explain that by means of some illustrations I think, because if I answer yes, as I would like to, I think I will convey a false impression, owing to the complexity of the subject. This is the way the thing works out. One item of plant may be placed in service and remain in situ until the end of its physical life, when it must be junked. In that case the service life is based on the life in that [fol. 9170] location which is the only location, and therefore that is what I call life from the cradle to the grave.

Another piece of property may be placed in one location, and then for one reason or another be taken out of service before the end of its useful life, and it may be placed in place and remain there for a more or less indefinite period. At some subsequent date it is replaced in service and re-

mains in that second location down to the end of its physical life, when it must be junked.

Now in the case of the second item, we base our calculations with respect to the depreciation rate on the lives in one place, and we necessarily have to do that under those conditions, because of the interim when that is carried in supplies and when no depreciation should accrue upon it. Therefore our general practice is to calculate the depreciation rate upon the life in one place, and that carries with it the calculation of the service life in one place. But due to the fact that the item, when taken out of service at the first location, has a considerable second hand value, the reserve which has been credited in respect to that item is not extinguished, but passes over into the second life, and it is only extinguished at the end of the life in the second place.

Q. If a property that is removed from one location to another, as you have described, is taken out, or placed in the supply account, and then put back into service at 100 per cent., at the cost of that property as of that date, which may be at a higher cost than originally when it was first [fol. 9171] put into service in the first place, in the first location, is the service in the second location based upon the consideration that it is received and placed there as new in the same way that it was placed in the first location?

A. Yes, sir, that is, as to these minor items of material, with which we are mainly concerned in the day to day operation of the plant, such as station apparatus and parts of private branch exchange switchboards and other property, which cannot be individualized while it is in the repair shop. The principal part of the plant of a telephone company which is re-usable is station apparatus, and there is comparatively a very small amount of material other than station apparatus which can be re-used in the manner that I have described.

Q. Doesn't the effect of wear and tear upon the property in the first location tend to shorten the life in the second location, the physical life?

A. As to the classes of property which we ordinarily re-use to any great extent, I would say no, as a broad answer. There may be exceptions to that. But the problem we have is primarily a question of station apparatus and the station apparatus is renovated in the repair shop in such a way as to be indistinguishable from new.

Q. You take poles, for instance, cross-arms and aerial equipment. That equipment is subject to the effect of the elements, exposures, and there is wear and tear deterioration which comes from those forces as well as the use of it; wouldn't the physical life of such equipment be materially [fol. 9172] reduced in time when it is placed into the second location and considered new? In other words, the life in the second location of such equipment could not be as long, I mean, as if it was actually new? Now what effect would that have upon your service life generally of property where you determine the service life by locations?

A. It would not have any effect on the service life or on the depreciation rate.

Q. No, it would not have an effect on the depreciation rate, I understand that, but upon the service life?

A. You mean the service life in one location or the total service life.

Q. What I am getting at is this, that a pole, for instance, has been in service in one location for years and then it is removed, it serves in another location a short time. It is removed and placed in a third location and serves a period of time. Now there has been three service lives that that pole has had if I am right?

A. Service lives in one location.

Q. In one location?

A. Yes, sir.

Q. Now what effect does that have upon the composite service life of the class of property computed that way as against the service life of a certain class of property which never is removed from place to place, but remains stationery in one place until the physical life is terminated?

A. Speaking broadly, it has no effect. Of course, the service life in one location is less than the total life. You can base your calculations either way, providing you have [fol. 9173] the necessary data. The depreciation data will be the same, whether you figure it on life in one place or whether you figure it from cradle to the grave.

Q. I am not talking about depreciation, I am talking about service life?

A. The service life in one location is manifestly less than from the cradle to the grave. That is obvious.

Q. If you base your rate upon that shortened life that occurs, doesn't that affect the rate?

A. No, sir.

Q. Materially?

A. No, it does not.

Q. Now, if your composite service life we will say due to these changes, is ten years, whereas, if not subject to changes, but remained in the same location, would be 20 years, and it would cost the same as all periods of that time, what effect would it have on the rate?

A. Well, now, that requires a complex answer, because it can be answered with reference to the material constituent or with reference to the total cost including the cost of installation. Let us eliminate the cost of installation and the intermediate removal data, and assume it is only the life in the two places; otherwise, it is too complex to follow, I am afraid. Take a pole. It is used in the first location for five years and is taken out and priced as a new pole, and is re-used elsewhere. It has another life of five years in another place and is then junked. If you make that calculation, assuming the original cost, is ten dollars, the amount that has to be written off at the end of the [fol. 9174] total physical life is ten dollars in any case, and the intermediate wash transaction, whereby it is taken out of one location and put in another, has no bearing. It would have a bearing if you did anything so ridiculous as to take the total original cost of the pole and assume that had to be written off over the first life in one place. Then you would get the entire life of the pole crowded into the first life, and you wouldn't have anything to write off in the second place, which would be against the uniform system of accounts. But if you handle the proposition correctly, it hasn't any effect on the rate. You simply increase the salvage in such a way as to offset the additional entry of the plant displaced, that is, if the pole is used and taken out of service at two locations, you have two entries for the plant replaced.

Mr. Shuler: Could that be explained by an example? Now for instance, the pole sets in one place for ten years. Of course, its service life is ten years.

Mr. Burr: Is it used up at the end of ten years?

Mr. Shuler: Yes, I mean cradle to grave in one place, ten years. Now take five poles, and for the purpose of this example, if it can be done, I should like to have it assumed that each one of those five poles, if remaining in one place, will live the same period. Now put each of those five poles,

each of them, in the different service lives, and what would the answer be as to the service life of them? In other words, I want to try to understand this method of determining service life in one situation as a method of determining [fol. 9175] service life. I admit I have not been able yet to do so. I suppose it washes out through the salvage phase of it.

Mr. Burr: That is it.

Mr. Shuler: That is one way I could imagine it; that is the only way I could imagine it.

The Witness: Here is one taken at random, and I don't know whether I have got it figured right, and I will ask your indulgence if I have not; but let us take a station which is worth ten dollars. Will you put down ten dollars, Mr. Shuler, and follow this illustration? Here is ten dollars, which is the original cost of the station. Now it is taken out of service at the end of the first life, and it is as good as new. So we put down ten dollars salvage opposite it. It is re-used in the second location at ten dollars and comes out again, in order to get a very exaggerated illustration, and is still worth ten dollars. You put down ten dollars salvage again.

Mr. Burr: That is, it *does* out as good as new.

The Witness: Yes. Now we put it in a third location as ten dollars and it comes out up there and you get ten cents junk. That may not be illustrative, but I am taking hypothetical figures. Now add up the total cost of plant displaced at your left hand, Mr. Shuler, it is $30.00; add up the total salvage and there is $20.10. Now, we will say that the total life in allocations is $10.00.

Mr. Burr: Ten years you mean.

[fol. 9176] The Witness: Yes, which is three and one-third years in each location. All right. We subtract the salvage, $20.10 from the original cost of $30.00, which gives you $9.90, cost of property, consumed in ten years, equal to 99 cents per year.

Now we take another station that is not re-used. You put the ten dollar station into this location where no re-use will be necessary, and you leave it there until it has to be junked, and that is ten cents salvage. Deduct ten cents salvage from that cost and you get $9.90. Divide that by the same ten years life and it gives you 99 cents per annum.

Mr. Shuler: You take and find out its service life by

finding out what it cost you to use during its cradle to the grave existence?

The Witness: Yes, that is right.

Mr. Shuler: Instead of computing the number of years it has served, you trace it from cradle to the grave and find out that that period took ten years and gives you all but its salvage, which was ten cents, and that makes it cost you $9.90.

The Witness: Yes, sir, that is right.

Mr. Shuler: Therefore, having cost you $9.90 during that ten years, the depreciation is 99 cents a year.

The Witness: Yes. In other words, Mr. Shuler, this proposition of treating the life in one place is merely an accounting expedient, and it reaches the same result. It [fol. 9177] is done because it is preferable from an accounting and mathematical standpoint. It is easier because in many cases you cannot trace the individuality of the items used. I could place a new and re-used set on this desk and very few people in the room could tell by inspection which is the new one, and it would not be new at that, because when the items go into the repair shop, new parts are substituted for the old ones. It is partly new and partly used.

Mr. Shuler: Take the same example and change the salvage values and see where we will come out.

The Witness: Change the salvage values? You take the examples.

Mr. Shuler: Say the second location; you say it is not as good as new; it is depreciated somewhat; would you then change its salvage value at that place?

The Witness: Even though we knew it——

Mr. Shuler: Yes.

The Witness: No.

Mr. Shuler: As long as it is used you consider its salvage value its original cost.

The Witness: Yes, sir, as long as it is fit to use again.

Mr. Shuler: As long as it is 100 per cent for service, for your bookkeeping and purposes of discovering its service life, it is ten dollars.

The Witness: Yes, there is no requirement in the uniform system of accounts that we should perpetuate those [fol. 9178] original values. The requirement of the Interstate Commerce Commission is that we put on the second hand value to us; but if it is fit for use and is in good

condition, we assume a second hand value equal to new, because it is for the time equal to new. If we were to allow the storekeepers to price these various items that come back into the store room more or less depreciated at prices which they might consider fair and which would be different from the next storekeeper, who would have slightly different ideas, it would place the accounting in the hands of the storekeepers and not in the hands of the general auditor. If we have the original cost of the item in the Western Electric price list or a supplier's price list, anybody can go there and see what it ought to be priced at. But if you put your accounting in the storekeeper's hands, you are going to get mixed up. If that had to be done, we would have to spend more money to see that the storekeeper did not get tangled upon on it. I like to see the accounts right, and I would put in routines which would require the segregation of secondhand price lists and everything necessary to keep that straight. We are taking one horn of the dilemma and ten years of experience proves to me we have taken the right one.

Mr. Shuler: Now, do I understand, Mr. Crunden, that you say that when these units of equipment are taken out of a station or a place and put into a store house, and then put into another situation or station, they are all taken out [fol. 9179] of the storehouse at salvage value.

The Witness: They are taken out of the storeroom at the price they went in the storeroom.

Mr. Shuler: All taken out at the price they went into the storeroom.

The Witness: Yes.

Mr. Shuler: And not at the present-day price when they are taken out of the storeroom.

The Witness: The general practice in that respect—There are several ways of treating the problem and I will give you a generalized statement, because I cannot tell you exactly what the Ohio Bell people do—This would be the general idea; you would keep a running account of the book average cost of the items of that kind carried in the storeroom, and you disburse all items at that price, so long as that average was good. From time to time, you would change the average.

Mr. Burr: Mr. Crunden, in using the illustrations that you have, there is also present the item of labor lost is there not?

Mr. Shuler: We have excepted that all the way through.

Mr. Burr: That is understood?

Mr. Shuler: Yes, that is understood. Now, your store supply cost will vary from time to time as prices fluctuate?

The Witness: Yes, sir.

Mr. Shuler: So that if something went into stores at ten [fol. 9180] dollars and present prices are twelve dollars, it comes out into the new location at twelve dollars doesn't it?

The Witness: No, it does not, because I said book average cost and not current average cost. For instance, supposing for the time being you are passing new items into your storeroom account at ten dollars; such being the price for which you buy them daily, during that period at which that ten dollar item is in effect, some of these items in good condition come back to the storeroom and are commingled with the new stores which are taken into the room at ten dollars, because that is the current price; at another date a lot of them come in at a changed price of eleven dollars. At the same time, some old items come out of old plant at eleven dollars and are mixed in with that plant. Now, you get an average cost somewhere in the neighborhood of ten added to eleven, divided by two, which is $10.50. It means you have taken one item out at ten dollars and used it at ten, and another item out at eleven dollars and used it at eleven. If you were able to sit in the storeroom and follow a particular item through and find an item that came in at ten dollars and went out as $10.50 and another that came in at ten dollars and went out at $9.50, that would be one thing. But that all comes out — clearing the storeroom account.

Mr. Shuler: From 1914 to 1924, you will admit that there has been a gradual increase of prices.

The Witness: Yes, sir.

[fol. 9181] Mr. Shuler: Now, let's take a pole and start it in at 1914 prices at $10.00 and run it through this same series that you have this pole, which you have kept at a static price. Wouldn't you then, although the pole originally cost the company $10.00—Wouldn't you then through this method arrive at a larger annual rate of depreciation than 99 cents.

The Witness: No.

Mr. Shuler: You think not.

The Witness: No.

Mr. Shuler: I don't care to take the time now, but I would like to have you give me that.

The Witness: You mean to say by that illustration you won't do that. Furthermore, I would like to follow that up in this way, recurring to this proposition of handling the supplies in the storeroom. Let us assume instead of using an average cost that somebody used lower than the present day cost. Suppose he took the pole into the storeroom at ten dollars and disbursed at twelve dollars. Then he would have two dollars discrepancy in his supply account. What happens to that two dollars credit? That remains in the account. As soon as the supplies inventory is taken that two dollars is credited back to the plant account, so that the thing would be bound to adjust itself in the long run. You cannot get away from the uniform system of accounts if you are disposed to. And we are not disposed to.

Mr. Shuler: I admit to one that is not perfectly familiar [fol. 9182] with that method of finding the service life, it is a little bit confusing and one conceives he sees holes in it, which might on the test not be so.

The Witness: The whole subject is a difficult subject. I think one might say of depreciation what Mr. Pickwick said of politics, it is a difficult subject of no inconsiderable magnitude.

Mr. Dotson: For the purpose of your accounting you carry the property on the books of the company at all times at 100 per cent value?

The Witness: Not value; 100 per cent cost.

By Mr. Dotson:

Q. I mean cost?

A. Yes.

Q. And that is done until the end of the service life of the property, when it is taken care of by your depreciation reserve is it not?

A. That is correct. That applies as I say to these minor items that are going in and out continually. That would not apply to a large switchboard. It could be individualized for retirement purposes.

Q. Now, you have the composite and component depreciation rates. If I understand you correctly, the component depreciation rate is based upon the life in service of a par-

ticular class of property, whereas the composite rate is based upon the average service life of various classes of property used by the company?

A. That is correct. The true depreciation rates are the so-called component depreciation rates. The composite rate is an accident. It results from the accidental weighting [fol. 9183] produced by the depreciation rates of the several classes of property which are embodied in the composite.

Q. Now your company, the Bell system, uses the composite rate does it not of depreciation all through its method of accounting?

A. No, we use the component rates, when you get down to the real accounting, but you have to have some compendious way of referring to this rate, so we always refer in ordinary conversation to the composite rate.

Q. The associated companies employ the same method of bookkeeping with reference to the depreciation account as the A. T. & T. Company does, that is, it uses the component rate in each class of property?

A. Yes, sir.

Q. And computes its depreciation reserve on that basis?

A. Yes, sir. Of course, where the relative weightings of the property do not change, you can apply your composite rate and get practically the same answer as you would by going to the trouble of applying your component rates. Sometimes we have done that.

Q. Referring to your testimony on page 615 of your testimony in chief, you speak of a turnover cycle method. I am not sure that we are clear on your conception of the turnover cycle method as you referred to it. Would you explain that in a few words?

A. Yes, I mean this; that the books of the telephone companies are nowadays and have been for many years, kept so as to show the gross additions to each class of property and the amounts displaced as well as the net additions. [fol. 9184] Now, by taking the property at any date and cumulating backwards the gross additions until they reach a sum equal to such property, the amount of time represented by the period of such cumulations of gross additions is a close approximation of the average service life of that class of property. A simple calculation based on the same mathematical principle can be made by taking the displacements of such class of property and cumulating them in

reverse chronological order, until the cumulating amount equals the total amount of plant of that class as it existed at some past date, the total amount of, and then the period of time from the beginning of such calculation backwards to that past date will give you the same close estimate of the average service life.

Mr. Shuler: Would that be true of your gross additions in a very rapidly growing and extending plant?

The Witness: In a very rapidly growing plant you would have to take the factor of growth into account.

Mr. Shuler: Certainly.

The Witness: Yes.

Mr. Shuler: That line would not show the true service life?

The Witness: No, not without some adjustment, and that error or dispersion would increase according as the rate of growth increased generally speaking. For *or* ordinary rates of growth, it is small, but with stupendous growths, it is immaterial.

Mr. Shuler: In a static plant it would be worthless.

[fol. 9185] The Witness: There would be no error. It would be a perfect calculation in a static plant.

Mr. Shuler: But supposing it has been static for ten years.

The Witness: So much the better.

Mr. Shuler: It would be, eh?

The Witness: Yes.

Q. The term, "Turnover" I presume is the term used, but it seems an incongruity to apply to a static plant?

A. Yes.

Q. But turnover may be done by replacements?

A. Turnover of the constituent elements.

Q. And it may happen to include the gross additions which you do include, as well as replacements?

A. It may happen—You mean that the calculation would be equally good both ways?

Q. Yes.

A. Yes, it would give you the same answer.

Q. Could you in a word state just what you do include in the cycle of retirements and additions? Do you include all of them?

A. All of them of that class of property, yes, sir.

Q. That applies to all classes of property?

A. Yes.

Q. But you only apply it as to classes?

A. You can only apply it where you have sufficient data to successfully make the calculation. For instance, we could not apply that method of determining life to a conduit system, because we have not had sufficient experience in [fol. 9186] underground conduit.

Q. Do you take into account the salvage value of property in that cycle turnover system?

A. No, you have to go on from that point. It does not help with respect to salvage. That only furnishes you with part of your answer.

Mr. Gentsch: I have this formal motion here for an order —Asking for an order to make the A. T. & T. a party. I do not want to argue the matter at all. But supplemental to that, I have prepared a further motion. I will say I just got this from the stenographer and she was hurrying and there are a lot of errors that I had to correct by chance, and possibly, I may have omitted a few of them now. But I have got a further motion to require the American Telephone & Telegraph Company, if this first motion is granted, to submit the cost of all apparatus and supplies sold by the Western Electric Company to the Ohio Bell Telephone Company during the year 1923, basing my grounds for that motion upon the grounds stated in the motion to make the A. T. & T. a party. This was gotten together very hurriedly, and I will file a supplemental brief to what I have filed here on several phases of the law.

Commissioner Poor: It may be filed. Counsel have asked about further time on this cross-examination. How much time do you expect to take up in the week of May 5th, with the Dayton Telephone case? I see on the calendar it is [fol. 9187] down here for two days, the fifth and sixth.

Mr. McConnaughey: I doubt if we can finish in two days.

And thereupon the further hearing of this matter was adjourned to Friday Morning, April 25, 1924.

[fol. 9188] Friday Morning

April 25, 1924.

And also A. B. Crunden, resuming the stand for further cross examination, continued his testimony as follows:

Cross-examined by Mr. Dotson:

(Last question and answer read.)

The Witness: I wanted to add another couple of sentences at that point, which I did not have time to add. It was in my mind that perhaps I had not made entirely clear, although I thought I did, that this re-use proposition applies only to the material constituent, and not to the cost of installation or the cost of removal. That is, if a pole should be re-used, that the original installation cost of the pole in the first location, would be a loss that would culminate at the time of the retirement of that pole from the first location. You get that loss then. The only item you carry over from the first life to the second is the material cost of the pole, which we treat at the average cost to the corresponding item now, if it is equivalent to new for our use. I think I made that clear, but I wanted to reiterate it.

And the other point I had in mind was this. I think Mr. Shuler said that the turnover cycle method would create [fol. 9189] an error in a period of rising prices. Now, that is perhaps susceptible of misunderstanding, and I would like to clarify that a little bit. Per se it would create no error. The turnover cycle method would show certain results, one of which would be that you were in a period of rising prices. Now, if you were to blindly accept the results without reasoning or regarding the factors in operating, of course, the error would be in you and not in the method. Perhaps that is a fine distinction in which you gentlemen are not interested. But I am trying to bring out the fact that the turnover cycle method cannot be applied blindly, that you must analyze the factors which you are operating and allow for them; that is necessary in any event, because what you are ultimately interested in is not what has happened in the past, but what is going to happen in the present and in the immediate future. Now, that is not necessarily the same as has happened in the past.

Mr. Shuler: Then just a question, I think, to clear it up. From Mr. Schneider's testimony I got the idea that that method was an exact and accurate method, because it was taken from the books of the company. Now, as you show by your statement, it is not that, but it requires conjectures, does it not?

A. No, it does not require conjectures, but it requires judgment as to how far the conditions in the present and

in the immediate future will parallel those that have obtained in the past during the period covered by your study of the turnover cycle figures. In other words, Mr. Shuler——

[fol. 9190] Mr. Shuler: I think you and I agree, except I prefer the word conjecture. And I think it is more or less of a guess, and I object to your word judgment, because judgment has a more serious meaning to me and involves a better basis for arriving at your conclusion than does conjecture.

The Witness: You are at perfect liberty to use the word "conjecture" of course. I would not take that privilege from you.

By Mr. Dotson:

Q. You mean by judgment that there is an estimate made by the accountant?

A. By the engineer, Mr. Dotson.

Q. By the engineer, which the accountant recognizes by placing it in the books of the company?

A. That is correct.

Q. Now, the depreciation that will occur due to unforeseen conditions, but based upon your experience of the past, there are——

A. There are certain things you cannot prove are going to happen, but which are likely to happen, because they have always happened.

Q. Yes.

A. Yes, that is the idea, Mr. Dotson.

Mr. Shuler: Now, I want to get clearly in mind, what is the thing the engineer must pass judgment upon in a rapidly growing business? Isn't it rather he must take into consideration whether the business in the future will grow in the same proportion that it has for a period in the past?

The Witness: That is one factor. And then another is whether the probable future salvage of this class of plant will be the same as it was during the turnover cycle method or any other method that he may take for study. Another [fol. 9191] point is as to whether costs of removal have increased during that period. And another is whether there has been a progressive change in the plant or substitution in the plant, which changes the life characteristics of the plant. That is the most important.

Mr. Shuler: Then after all the human element and personal opinion is a great factor, even with the turnover cycle method?

The Witness: Yes, sir, that is recognized by the uniform system of accounts, because the Interstate Commerce Commission says that companies should be prepared to furnish the Commission upon demand the rules and a sworn statement of the facts, expert opinions and estimates upon which they are based. That occurs on page 67.

Mr. Shuler: I had obtained the impression from Mr. Schneider that by simply *by* going to the books and getting the gross additions and taking them back, you would — an accurate service life result. But that is not true.

The Witness: No, sir.

Mr. Burr: Oh yes, it is with reference to the past.

Mr. Shuler: No, it is not.

The Witness: With reference to the past, yes. But I understood your question to mean that you would get the exact figure that you needed for the present and the immediate future without subjecting it to the element of judgment.

Mr. Shuler: The books have sufficient records to go back fifteen years. During the last five years there has been [fol. 9192] a very rapid increase in price. Now, you want to determine the service life over that period of years. Wouldn't the fact that the last five years of the plant the gross additions had been exceedingly large and abnormal, affect the service life arrived at, unless you took into consideration these elements upon which judgment must be passed into consideration.

The Witness: It possibly might but not necessarily.

Mr. Burr: But you are assuming they have been normal.

Mr. Shuler: Certainly.

Mr. Burr: You are assuming that for the purpose of the question.

Mr. McConnaughey: Mr. Crunden, isn't it a fact that both the increase in the plant, growth of the plant, and the enhancing of prices, the increase in the range of prices, would both affect the showing of this turnover cycle method.

The Witness: Yes, they would. At these rates of growth the influence would be comparatively slight.

Q. But there would be an influence?

The Witness: At extreme rates of growth the influence would be marked. There would be an influence theoretically at any rate.

Mr. McConnaughey: Suppose that over a period of five years there had been an increase of 50 or 75 per cent in the price of property in place, I mean the unit prices, and a normal growth; that also would affect the showing of the turnover cycle method, wouldn't it, and throw it out of line?

[fol. 9193] The Witness: That would influence it to some extent, but the exact extent would have to be determined by a study of the particular property.

Mr. McConnaughey: The particular figure, certainly; and it would have a tendency to show a shorter life rather than a longer life.

The Witness: Yes. You would have also to take into account whether the rapidly rising price level continued to the end of the term which you had under study or whether there was a rise and then a decline.

Mr. McConnaughey: If the prices struck about an average, it wouldn't make any difference, would it.

The Witness: No.

Mr. Shuler: If the records of the company were insufficient to make one turnover, you could not use the method, could you?

The Witness: Unless the information was sufficient to enable you to make a reasonable projection of the balance of the necessary term. In the event you could not do that, you would have to fall back upon the expert opinion and the judgment of the engineer in the manner contemplated in the uniform accounts.

Commissioner Poor: Now, gentlemen, I think we better go back to our old rule, that the counsel on this side of the table who is examining, doing the cross examining principally, should continue and conclude his examination be-

[fol. 9194] fore he is broken into. It destroys his continuity of thought, and with three or four examining counsel it is difficult to get anything out of the examination. If the other counsel should want to ask questions, let them make note of it and they will be given an opportunity. But they need not break in on the man who is making the principal examination. I do not believe we are getting an unscram-

bled egg record by going at it that way. I think it is better the other way.

By Mr. Dotson:

Q. Following the inquiry just made, Mr. Crunden, do not the physical characteristics of the plant elements have great weight in influencing the turnover cycle, a greater weight I mean in influencing the turnover cycle than the fluctuation in prices?

A. That would depend upon circumstances. I can talk about this as a theoretical proposition, and it might or might not in theory.

Q. The theory you contemplate shall reflect the facts?

A. Yes, sir. We can agree upon the accounting theory and then the engineers must supply the facts.

Q. If the theory is substantially in compliance with the facts, and assuming that it is in compliance substantially with the facts, then what would you say about the physical characteristics, the influence of the physical characteristics, and the weight of that upon the turnover cycle method as against the fluctuation of prices?

A. If they were the predominant factor, of course, they should receive predominant consideration. Whatever the [fol. 9195] fact is should be determined and demonstrated so far as possible.

Q. Do you in your turnover cycle method include the additions to plant which take care of the actual growth of the plant due to the growth of the community and the additions of the necessary plant to take care of additional business? I do not know whether that has been brought out in your statements or not. I would like to know about that?

A. The proposition is that the turnover cycle method should be applied to the books as they stand and a certain result developed, and then to that result the engineer applies the necessary corrections. So that if it were a growing company, if considerable new business were being added, that would be reflected in figures which would be obtained by the turnover cycle method. That would not have any particular bearing on the proposition, Mr. Dotson, as you can see by recalling my statement to the effect that the same mathematical result could be obtained by cumulating the retirements in reverse chronological order

to a point in the past at which they agree in amount with the then standing property. In that case the additions obviously would not have anything to do with the result obtained.

Q. Then your answer would be that it does not include as I have referred to it the additions to plant?

A. It does include it, but it does not have any effect upon the application of the method.

Q. You mean by that that it does not change the percentage of depreciation—well, the percentage of depreciation? [fol. 9196] A. It may or it may not.

Q. Does the turnover cycle method seek to keep dollars in property intact at all times?

A. Well, the object of the turnover cycle calculation is to shed some light upon the average life of the property. That is as far as it goes.

Q. It does not then undertake to be governed by the dollars, the investment in dollars, in the property at all times or at all stages? Do I make myself clear?

A. Yes, sir, I am going to answer that. The object sought, the final object of the whole business, so far as the books are concerned, is to charge such amounts for depreciation expense as will cover the cost of the property that is used up. Now, in arriving at the amount of the charges, you have to find certain things; the average service life, the salvage, and the cost of removal and so on. Now, to find the average service life, you have to go to some things, and the turnover cycle method is a thing used in determining that average service life; so it is one of the things used in determining that thing. Does that make it clear, Mr. Dotson?

Q. That expresses it from your standpoint. That is what I want to get at.

A. Yes, sir.

Q. Now, calling your attention to Crunden's Exhibits 17, 19 and 21, on what was the realized depreciation based as shown in these Exhibits?

A. The realized depreciation reflected in Exhibits 17 and 18 and 19 was derived from Exhibit 16, columns 9 and 12. Exhibit 16 is that Exhibit which is on the larger piece [fol. 9197] of paper.

Q. Yes, I have it here.

A. The realized depreciation in Exhibit 21 is purely a

mathematical calculation. It is not based on any of the other Exhibits introduced.

Q. Now, what columns in Exhibit 16 did you say that was based on particularly?

A. Columns 9 and 12.

Q. 9 and 12. Now, does the annual mortality curve on chart D of your Exhibit 14 apply to your Exhibit 21?

A. No, sir.

Q. It does not?

A. No, sir. Chart D of Exhibit 14 was taken from Exhibit 13, and Exhibit 21 is entirely a separate Exhibit, designed to express one particular phase of the matter. It does not hook up with the other Exhibits, although the principles that are involved carry unchanged through all of these Exhibits.

Q. Then you do not use the mortality curve appearing on chart D, Exhibit 14, in making your chart on Exhibit 21?

A. Not that particular curve, no, sir.

Q. Well, what kind of mortality curve did you use?

A. Why I used a typical mortality curve which I took at random. The results will be of the same general order if you take any reasonable mortality curve.

Q. Could you give us that mortality curve?

A. Yes, I will call you off the figures if you like.

Q. Well, let's get it in the record.

A. For every $100.00 of plant, the retirements would be as follows: First year, $92.00; second year $370.00; third [fol. 9198] year $763.00; fourth year, $1,284.00; fifth year, $2,035.00; sixth year, $3,158.00; seventh year, $5,158.00; eighth year, $6,298.00; ninth year, $7,044.00; tenth year, $7,582.00; eleventh year, $7,958.00; twelfth year, $8,258.00. Now the years from '13 to '24 inclusive are the reverse of the figures just quoted. That is to say the thirteenth year is $8,258.00 and the twenty-fourth year is $92.00.

Q. Now, you have no chart of this curve in your possession?

A. No, sir, it would be very easy to anybody to make one. It is just simply a question of plotting one on a piece of paper.

Q. Referring to your Exhibit 17 again, known as net investment reserve for accrued depreciation at beginning of year, this curve as shown in the Exhibit between the tenth and fifteenth year inclusive, both, the net investment for

accrued depreciation remains constant apparently; are we to understand from this that after a period of years these quantities become constant?

A. On the average, that is, after the net investment becomes static, the reserve will fluctuate above and below a certain line. It won't run straight across the page in the manner described in this Exhibit in actual practice, because practical business reasons will make it necessary to vary the amount of retirements in successive years, but it will fluctuate above and below a given line.

Q. But in charting that you in practice do not show that fluctuation; you show the given line——

A. Yes, in an Exhibit of this kind.

[fol. 9199] Q. And you use the given line because it reflects the average condition of the plant during that time?

A. The average condition of the reserve.

Q. Of the reserve, I should say?

A. During that time.

Q. Now, if these items remain constant, is it true that the ratio of those items would remain also constant?

A. Under those conditions the ratio would remain constant, yes, sir.

Q. Then that being true the accrued depreciation is a constant percentage of the net investment when the amount of the investment remains constant; that is true, too, is it not?

A. Yes, with the reservations I have made regarding fluctuations in actual practice.

Q. And that is true whether applied to the accrued or the realized depreciation, isn't it?

A. Yes, that is true. That is shown by Exhibit 18, Mr. Dotson.

Q. Further with reference to Exhibit 17, does the shape of the increasing part of the curve, reserve for accrued depreciation—that is the designation—and the decreasing portion of it reflect any way the shape of the mortality curve which you have assumed in these examples?

A. I stated in my explanation of these Exhibits that I had based the calculations upon the retirement at the end of five years uniformly. That is shown at the bottom of Exhibit 16. That is not a mortality curve retirement, but a retirement at the end of average life, but had a mortality

curve retirement been assumed, you would get the same general order of curve in Exhibit 17, as you have.

[fol. 9200] Q. I see.

A. It would not be exactly the same, but the principles would be illustrated by it equally well.

Q. Well then, explain the causes of the variation in the increasing and descending portion of the curve designating "reserve for accrued depreciation" in Exhibit 17, that is, why the first part is concave and the descending part is convex? Why should it take that form?

A. That simply happens because we have the comparatively few items embodied in that Exhibit. We have only got thirty taxicabs altogether in this illustration. The shape of the line there on Exhibit 17, representing the growth of the reserve, is accidental to that extent. That might be more concave or less concave, depending on the number of items which you take, but it would not change the general principle, which is, that as the investment increases the reserve increases, and after the investment has ceased to grow the reserve ceases to grow, and with the eventual retirement of the property the reserve is extinguished.

Q. Then has this illustration or chart any practical significance in the telephone case such as we have here, where it includes a property of the magnitude of the telephone properties of the Ohio Bell, when this is confined to just a small class of property, and as I understand you, might show a different curve if applied to a property of large magnitude.

A. Well, every property will show a different curve, of course. The object of this Exhibit and those that went with it was to endeavor to make clear the fundamentals of depre-

[fol. 9201] ciation accounting to the gentlemen who are interested. If it does that it serves its purpose. If it does not do so, we should not have introduced it.

Q. I would like to have you explain Crunden Exhibit 18 in terms of income?

A. If I apprehend your question, the answer is this: That the income will not be properly stated unless there is included in the expenses deducted from the gross revenues in the ascertainment of the income depreciation according to the ball and chain line on this Exhibit, which is designated annual expense of depreciation and covers the depreciation upon the straight line basis. If in the ascertainment of the annual income the deduction for depreciation expense were made on the basis of the annual realized depreciation,

it would not spread the depreciation expense evenly over the life of the property depreciated, and the net income arrived at would be fictitious. It might be more or less than the true income.

Q. Then may we truthfully assume and say that this diagram as to annual realized depreciation is an arbitrary assumption, or is it one that is a result of experience, and is in point in matter of experience?

A. Oh, it is decidedly in point, both in the matter of the principles involved and in the matter of experience.

Q. Referring to Exhibit 19, this still refers to what is called the taxicab Exhibits; is this Exhibit or diagram really representative of any telephone plant which you have ever had any personal experience with?

[fol. 9202] A. Well, this Exhibit illustrates principles and the principles involved apply to every telephone plant, in fact, to every public utility plant in the United States in my judgment.

Q. And according to your view the value of that lies in the principle which it demonstrates, that you claim can be made use of in any telephone plant?

A. Yes, sir. The problem illustrated in that Exhibit is the same one that is exemplified in the controversy regarding the so-called fraternal insurance. Now, I haven't any objection to fraternal insurance as long as the man that is getting it knows that he is getting it, but if he thinks he is getting the equivalent of the Old Line Insurance, he is under a false impression. The item on that chart representing annual realized depreciation, if it were taken as the measure of the expense, or, in the case of the fraternal organization, of the actual accruing loss, would mislead everyone, because it does not represent the loss, and the amount by which it fails to cover the loss is illustrated by the solid line in the last years of that chart, where the submerged loss culminates and proves a burden too heavy to be borne. And that shows where the fraternal insurance has broken down in this country.

Q. Now, the part of the line that you last mentioned is the one that extends upward?

A. Yes, sir, the annual realized depreciation.

Q. Taking Exhibit No. 21, I call attention to the annual realized depreciation: if the plant grows five per cent per year, you show this line as practically a straight line

[fol. 9203] after the plant has reached a certain stage in its growth?

A. Providing the geometrical rate of growth continues unchanged.

Q. Yes, assuming that. Now, is it true, assuming these facts, that the realized depreciation after plant has reached a state of stability has a constant value?

A. That is, if the plant reaches a stable age distribution, accompanied by an invariable rate of growth.

Q. Yes, as reflected by this line represented as realized depreciation when plant grows five per cent?

A. Yes, that is actually what this chart shows, Mr. Dotson.

Q. That as a matter of fact then would be true and that same statement would apply to the other lines representing the annual realized depreciation when plant grows ten per cent per year?

A. Yes, sir.

Q. Also in the other case grows twenty per cent per year?

A. Yes, sir.

Q. And that fact is reflected in this Exhibit 21 by the straightness of the line as you have extended it over the chart?

A. Yes, sir. To put the thing in a paradoxical form, if the rate of growth were infinite, the realized depreciation would be zero, although the actual depreciation expense would remain the same.

Q. Well, the annual realized depreciation is ratably less in a plant that is growing than in one that is not growing, isn't that true?

A. Yes, sir—may I have the question again? I don't know that I got it.

[fol. 9204] (Question read.)

A. Yes.

Q. Then the converse would be true, that the reduced depreciation is proportionate with the growth of the plant also?

A. That is, with the realized depreciation?

Q. Yes, is proportionately less.

A. Some smaller percentage of the annual expense or depreciation according as the rate of growth increases?

Q. Yes.

A. That is correct, yes.

Q. Now, the annual rate of plant growth, you mean by that the additions in any one year, that is, net additions in any one year, that is, net additions in any one year to total plant at the beginning of the year; is that what you mean?

A. Yes, I mean that if the net additions at the beginning of the first year were $100,000, representing the original property, that in the second year you would add $5,000 to that and the next year you would add $5,250 to that, the last mentioned figure being five per cent of the original sum, plus five per cent of the amount added in the first year.

Q. On Exhibit 21 the line labeled annual expense of depreciation, is that correctly drawn on that chart? In other words, should it not curve upward as the curves below that in starting?

A. No, it should not.

Q. What is the reason?

A. Well, because the annual expense of depreciation in this plant, which is assumed to have continuously the same depreciation characteristics, is the same in one year as in another, whereas in the case of the realized depreciation, the [fol. 9205] plant will be new in the first year, and with the class of mortality curve assumed the retirements will be negligible, that is to say, in the first year the retirements are $92.00, equal to .07 per cent of the property, whereas the straight line depreciation for the same year is the full six per cent as it is in any year.

Q. You have described the basis in this statement then upon which you predicate or by which you justify the line in the form it appears on this Exhibit 21?

A. Read the question. I didn't get it.

(Question read.)

A. I am probably a bit thick, Mr. Dotson, but I don't get that.

Mr. Dotson: Just cut that out.

Q. Don't you by this method accrue more depreciation in the first years than in the latter years of the service life of the property?

A. No, sir, that line headed "Annual expense depreciation," which is on the six per cent level, would spread the accruing depreciation evenly over the life of the property in service. It is a straight line formula.

Q. Now, a number of witnesses have used the term, "Prove in" in relation to proposed additions or extensions

to plant. What is *the* meant by the term "Prove in" as you understand it?

A. I never used the term purposely, but I presume the additions will be justified on the basis of good judgment.

Q. Your understanding then of it is that it simply means that the property that is used or installed meets the require-
[fol. 9206] ments.

Mr. Burr: No, that is not what he said.

Mr. Dotson: I thought he did.

Mr. Burr: Not that it meets the requirements, but that the expenditure is justified.

The Witness: Well, it simply means that you build a stadium here in Columbus, and it either proves in or it does not prove in, that is, it is proportionate to the size of the University and the people who make use of the Stadium, or it is inadequate, or it is too large and wasteful and extravagant. If it is the right sort of Stadium, then it proves in.

Q. Yes. Now, applying this term to an example, suppose we have a demand for service which is in excess of the existing cable facilities in a given region, and by substituting a larger cable, the additional subscribers who can be served by it will produce revenue enough to prove in above the entire cost of substitution, including the loss of the cable taken down, that is a case, isn't, it, in using the term "Prove in"——

A. That is, certain cable is inadequate you mean?

Q. Yes.

A. And they substitute a larger cable?

Q. Yes.

A. Well, I should say the term could reasonably be used that way.

Q. Just one more question. The figures which you gave on the mortality curve which we were discussing were those based on the gross or the net retirements of the plant?
[fol. 9207] A. No, they would be based upon all retirements. The retirements are the retirements. They are not involved in the additions.

Q. They are based then on the actual retirements?

A. Yes, sir, in this hypothetical illustration. They were not taken from the experience of any particular class of property. I simply asked one of my men to take a reasonable mortality curve.

Mr. Dotson: I think that that is all that I have to examine him on, gentlemen—No, I think there is one more question.

Q. Referring to Exhibits 13 and 14 of the Crunden Exhibits, table A, Curve D; do the rate of retirement or the shape of the curve as shown follow any natural observed law? That was the question suggested here. I haven't got the charts here.

A. I will lend you my chart.

Q. Well, I have 14 here, I see.

A. You mean the precise curve that is drawn on the piece of paper, whether that is based on some actual experience on a particular item or class of plant?

Q. Any law that has been established from experience, I assume, by which the curve is governed?

A. Not the actual curve drawn there. That is illustrative of the practical condition. The practical condition is that when the class of property is of a given type that it tends to have a certain average life, and the majority of the retirements cluster around that life. But there are some weak and unfortunate members that drop out early in [fol. 9208] the existence of the plant, and there are some strongly resisting and fortunate members that linger along long after the average life.

Q. Then the curve here would be rather an arbitrary curve than a curve true to experience or observation?

A. I am not offering the curve as illustrative of actual experience with any class of plant. I merely am illustrating the principles involved and I deliberately took curves such as these on that account, so that there would be no confusion; that is, they are generally representative, without being an attempt to show or prove in the experience on any particular class of items.

Recross-examination.

By Mr. Kinnison:

Q. Mr. Crunden, will you refer to your testimony on page 592?

A. Yes, sir.

Q. You will notice that I interrupted you there with a question where I said, "We will use the word cost as the basis upon which you base your depreciation charge. What do you mean by cost?" You say, "I mean the amount

shown on the books." I made an additional inquiry, "The actual cost?" You said, "Oh, yes," I said, "That means the actual cost of construction?" And you said, "Generally speaking it is the actual cost of construction, yes sir." Now, I have in mind the actual unification process of the Ohio State and the Ohio Bell in the Canton area, in which I will assume that the cost of construction of the plant of [fol. 9209] the Ohio State Telephone Company in that area was one figure and the Ohio Bell Telephone Company at the time of its consolidation or the exchange of securities paid still another figure, and that an appraisal of the property of the company would still be another figure. Now, to which of those three figures would you apply your depreciation rate?

A. The accounting would be based upon the dollars of that property as shown on the general books of the Ohio Bell Company as a result of the merger of the two companies.

Q. Then, so that I may understand, do you mean that irrespective of the actual construction cost to the Ohio State Telephone Company that you would base your depreciation upon the book values which the Ohio Bell would set up after it had acquired the Ohio State?

A. The accountant necessarily concerns himself with the amounts on his books, Mr. Kinnison, and the object of the depreciation account to him, is to charge out in the expenses in equal annual installments the amounts shown in the fixed capital with respect to certain property, so that it would be the amount that was placed on the books of the Ohio Bell Company as a result of the merger of the accounts of the Ohio State Company with the Ohio Bell.

Q. Well, I am not speaking as an accountant, Mr. Crunden, and you can assist me by confining yourself to what I am trying to get at, if you understand me, that is to say, the cost which the Ohio Bell would set up on its books would not necessarily be the cost of construction to the Ohio State, would it?

A. Why it would depend, it would seem to me upon [fol. 9210] whether the actual cost had been placed upon the books of the Ohio State. I was not in on this merger of the books, but my understanding—perhaps you know about this feature—is that the accounts of the two companies were merged as to their fixed capital. If that is true, if that understanding is correct, then if the books of the Ohio

State Company showed the actual cost, that actual cost would now be reflected on the Ohio Bell. On the other hand if the Ohio State had charged more or less to its plant account, that fact would also be reflected.

Q. In your mind should there be any relation between the cost of acquiring the Ohio State property to the Ohio Bell Telephone Company and the book values which they should set up for the purpose of depreciation, assuming that the records of the Ohio State Company are complete to the extent of showing actual cost?

A. I dislike to talk ex cathedra about a merger with which I was not connected, but what should be done is to write off the amount that is on the books of the Ohio Bell Company.

Q. That is meaningless to me, Mr. Crunden. I have given you a hypothetical case, which I think has some basis in fact. For example, the Ohio State property, we will assume, cost one figure, which could be ascertained, we will assume, from the records of the Ohio State property; the Ohio Bell Telephone Company took it over; whether you call it a merger and consolidation or a purchase, it paid still another figure; and the appraisal might still be another figure. When you attempt to depreciate that property would you depreciate on either of those figures or would [fol. 9211] you set up a new figure on the books of the Ohio Bell Company for depreciation? I have just given you the hypothetical question. I am not asking you to call upon your lack of information or your information concerning the actual way in which it was done. But just confine yourself to that question.

A. Let us assume that the Ohio State——

Q. Let us take the assumption the way I have it.

A. Well, there is more than one possibility.

Q. I realize that. I want you to give it that way.

A. Let us assume that what was done was to——

Q. If you will pardon me again, Mr. Crunden——

A. I am asking your question again.

Q. Don't do it with another assumption.

A. I am coming down another street. I am turning a right hand corner instead of a left. I won't use that phrase again. If the amount placed on the books of the Ohio Bell Telephone Company had been confined entirely to fixed capital and was the amount necessary to balance the payment that it made, which was, of course, reflected in its

liabilities; then the amount of fixed capital so added would be the amount that should be depreciated and it would be the actual cost to the Ohio Bell Company.

Q. That is to say, irrespective of the actual construction cost to the Ohio State Company, you would set up as a basis for depreciation the actual cost to the Ohio Bell Company; is that correct?

A. Yes, that is right. Now then——

Q. Are you through?

A. Yes. Now, if the actual cost to the Ohio Bell Com- [fol. 9212] pany, was the amount at which the property had stood charged to the accounts of the Ohio Sate Company, then that would be the same figure. So that it would be the same figure in any event.

Q. You mean to say if the Ohio Bell bought it at book figures, which would chance in those cases to be coincident; is that your answer to my question? That is to say, if the Ohio Bell bought it upon the book values as shown by the Ohio State, of necessity the two would be identical? That is all you mean?

A. Yes, that is what I mean.

Q. As a matter of fact, Mr. Crunden, I think it has been definitely claimed by the telephone company in this case, taking it as an assumption, that there was no purchase of the property of the Ohio State Telephone Company by the Ohio Bell, but that it was a consolidation which was effected by an exchange of securities. How would you determine the cost then to the Ohio Bell Telephone Company of the physical properties of the Ohio State?

A. Well, I would take the facts in that situation and lay them before the Interstate Commerce Commission and get the prescribed accounting, set up my books on that basis, and thereafter charge depreciation according to the way the books were set up.

Q. That is to say you would go forward on the set-up which the Bell would make after the acquisition of the property?

A. Yes, sir, and that would have to conform to the uniform system of accounting.

Q. However, we will assume this case being tried right here, that the Ohio Bell Telephone Company is going to [fol. 9213] attempt to depreciate certain property values and set up a fair rate of depreciation; should in your opin-

ion that depreciation be set up as against what it cost the Ohio Bell Telephone Company or what the physical property actually cost the Ohio State Telephone Company?

A. Now, you are asking——

Q. Not as an accounting theory.

A. No, but that is precisely my trouble. You take an accountant and you make the preface that you do not want to ask him questions an an accountant.

Q. I don't believe that question necessitates going into any theory of accountancy. I believe it is susceptible of a plain answer.

A. It no doubt is from the man who is competent to make it. But I am qualifying here as an accountant, and frankly that is the only standpoint that I feel I am an expert from. I feel that I can talk loosely about that, but when you step outside that and ask me to disregard my qualification and to speak on some other basis, I do not think that is fair to me.

Q. I want to be fair, Mr. Crunden, but I understood that not only have you qualified as an expert accountant, but that you have also qualified as an expert on depreciation. Do you want the Commission to understand that that had not happened?

A. No, I want them to understand that I have not, that is, I claim to be an expert on the accounting feature of depreciation. I do not pretend to be an expert on the subject of engineering depreciation and the determination of the amount of depreciation of the standing property by its examination. I am not familiar in more than a general way [fol. 9214] with these propositions that we have to treat upon our books. I have to rely for that matter upon the judgment of the people who take up that branch of the work.

Q. Now, are we together on this proposition, that, waiving the question of a merger, ordinarily the Ohio Bell Telephone Company would make its depreciation charge as against the actual cost of the property to it?

A. On its books, yes, sir.

Q. That is the accepted theory of depreciation?

A. Yes. Understand, of course, that a great deal of accounting is done on the basis of averages, due to inability to treat the individual items with proper economy and the minimum of accounting expense.

Q. I believe you have testified and used the expression,

"Keeping the original investment intact," have you not?

A. I do not believe I used that. I may have done it.

Q. How about keeping the capital whole; did you use that expression in attempting to find a basis against which the depreciation charge should operate?

A. Yes, the idea is that you charge the expenses in such wise that the entire cost of property consumed in operations is covered by the charges.

Q. Now, that cost of property that you have testified to has in mind not the acquisition of used property from another company, does it, but does it have in mind an original purchase by the same company.

(Question read.)

Mr. Kinnison: I will withdraw that question.

[fol. 9215] Q. I mean to say that ordinarily when you consider the theory of depreciation you have in mind property which the Ohio Bell Company originally acquired itself and immediately put into its own plant, and you do not have in mind the acquisition of the entire assets of another company, do you, and the transfer of it to your books?

A. Well, I have in mind any dollars reflected in the fixed capital accounts of the Ohio Bell, which are being consumed in operation. I do not care whether it was property that the company constructed or which it purchased or which it acquired as a result of the merger, so long as it was represented on the books of the Ohio Bell Company by charges to the fixed capital accounts.

Q. Giving to the company the right to make an arbitrary decision as to how they would place it upon the books?

A. So far as this broad phase of the problem is concerned, of course, the company has no such right as a matter of fact. It is tied hand and foot as to what it should put on the books, by the Interstate Commerce Commission's system of accounting. But that is another quarter section. We find ourselves on this proposition of depreciation with certain figures on the books, which are there, and our problem is to charge the loss of that property to expense.

Q. It is true when the Ohio Bell acquired the Ohio State it had to establish some figure on its books, didn't it?

A. Yes, sir.

Q. To that extent that act in itself was an arbitrary act on the part of the telephone company which might or might [fol. 9216] not be substantiated by the facts?

A. Well——

Mr. Kinnison: I will withdraw that question.

Mr. Burr: Let's have it understood that when reference is made to the acquisition by the Ohio Bell Company of the property of the Ohio State Company, that can only mean one thing, namely, the act by which the properties of the old Ohio Bell Company and the Ohio State Company were consolidated, the point I have in mind being, Mr. Kinnison, that acquisition is a matter of record here before this Commission and shows on its face that it was a consolidation under the statutory provisions covering that subject. So that it is just as proper to say that the Ohio State Company acquired the property of the Ohio Bell Company as it is to say that the Ohio Bell Company acquired the property of the Ohio State. As a matter of fact the two properties were rolled together, they were fused into one company by virtue of the consolidation Act, and the law specifically says that that is what happens. So that it is not, strictly speaking, an acquisition of property of the Ohio State Company or any other company by the Ohio Bell.

Mr. Kinnison: I am giving to this witness a hypothetical question. The Commission may apply the facts.

Mr. Burr: I thought that your reference a little while ago to the consolidation case meant that you were construing the consolidation as an acquisition by the Ohio Bell of property of the Ohio State.

Mr. Kinnison: I recall that when this case started you wanted it to be quite definitely known that there had been [fol. 9217] no purchase of the assets of the Ohio State by the Ohio Bell, but there was a transfer of title. The title to the property changed hands and passed to another corporation. Whether you call the transaction a sale or consolidation in terms of law, you are setting up a new book value, and I want to know how it was done.

Mr. Burr: The title changed hands by virtue of filing with the Secretary of State an agreement of consolidation.

Mr. Kinnison: The mode of it is entirely aside from the issue.

Mr. Burr: I do not quite agree with you, because when

you speak of a transfer, that ordinarily means that a seller clothes a purchaser with title to property formerly owned by the seller. Now, that is not what happens in a consolidation or not what happened in this case. The two companies, the old Ohio Bell and the Ohio State Company, entered into an agreement of consolidation. That agreement of consolidation was filed in the office of the Secretary of State by both companies, and there was not an agreement whereby the Ohio State agreed to convey its property to the Ohio Bell or vice versa. The agreement of consolidation, which was mutually entered into by the two parties, was filed in the office of the Secretary of State, and thereupon the law says that that filing vests the consolidated company the titles to the properties of the two constituent companies.

Mr. Kinnison: Which means that title has changed hands?

Mr. Burr: The title has changed hands, if you please [fol. 9218] but the title to the Ohio State Company's property did not, thereby become vested in the then Ohio Bell Company.

Mr. Kinnison: Became vested in the new company?

Mr. Burr: A new company was created by the act of consolidation. The two old constituent companies disappeared, because that has been settled by the United States Supreme Court in construing our Ohio law. And there was created by virtue of the filing of the consolidation agreement in the office of the Secretary of State a new company, in which was vested the titles of the property formerly owned by the two constituent companies.

Mr. Kinnison: I think that is absolutely true, but it is not germane to the proposition I am trying to raise here, Mr. Burr.

Mr. Burr: Very well.

Q. Mr. Crunden, I am going to give you another hypothetical case. Treat it as a hypothesis entirely, and the Commission will also. I am going to assume that the property which the new company acquired in the Canton area from the Ohio State Telephone Company cost the Ohio State Telephone Company one million dollars. I am going to assume that in an exchange of securities the approximate values which changed hands were $1,500,000?

A. That is, the Ohio Bell Company purchased from the Ohio State Company property worth a million and paid a million and a half.

Q. I am not going to call it a purchase at all. I am just giving you the hypothesis as I have already created it. Here we have property which costs the Ohio State Tele-
[fol. 9219] phone Company $1,000,000, cost them that, going back to your definition of costs as we have earlier reviewed it?

A. Yes, sir.

Q. Through a consolidation or merger or what not in exchange for that original cost of a million dollars, the stockholders of the Ohio State Telephone Company received evidence of interest in the new company to the extent of $1,500,000, whether by cash or stock in the new company or what not; that the fair appraisal value of that company at the present time is $2,000,000.

Mr. Burr: You say at the present time or at the time of the exchange.

Q. Let us say at the time of the exchange, for the sake of the hypothesis. Now, you are going to depreciate that property we are going to say. What will you depreciate it as against? The million, the million five hundred thousand, the two million, or will it still be another figure which the Telephone Company will set up on its books?

A. The correct way to answer that is to say that you will treat for depreciation purposes the amount that the company set up on its books.

Q. What is it? What would it be in that case, could you say?

A. That would demand a study of the merger by somebody competent to handle those things.

Q. Considering what elements?

A. Considering the uniform system of accounts.

Q. That directly traces it back to values, doesn't it?

A. I am not familiar with merger accounting. I have never accounted for merging.

[fol. 9220] Q. Haven't you a problem of values?

A. No, sir.

Q. Why not? I have given you the values.

A. The accountant does not treat values per se on his books. Books are set up on the basis of cost.

Q. What cost? There you have three elements of cost. What cost?

A. If I had the agreements before me and time to study them and people to advise me as to what the accounting principles were, I could decide what the entries should be. What ought to be done is to take a man like Mr. Van Zant, who has spent years studying this kind of thing, turn him loose, let him go down to Washington, and determine what is a correct system of accounting and set up of figures, and those figures should be used in determining depreciation.

Q. What do those figures on the books represent? They are not arbitrary, are they?

A. No.

Q. They must reflect some study of values, must they not?

A. I don't know whether values would be an essential part of such a study or not.

Q. Don't you depreciate against values which enter into original cost?

A. Not on the books, no. You cannot keep books otherwise than on the basis of cost.

Q. Then you say that entirely aside from what the property costs the Ohio State during the period of construction, entirely aside from what the Ohio Bell must have paid for it and entirely aside from what the property was worth at that time, that the company still has the right to set up on its books for purposes of depreciation an entirely new basis, from which depreciation will be figured?

[fol. 9221] A. No. It might be the proper way to place that upon the books, would be to place the amount upon the books of the old Ohio State Company; it may be that something else would be proper. That would involve a study of the merger by some competent person to determine what the correct accounting should be.

Q. You do not need any agreements or mergers; I have supplied you the facts; I have supplied you the facts for this hypothesis—three values?

A. I know but——

Q. Just a minute. I am not concerned with the theory of the accountancy of it. I am concerned with the dollars and cents which will be set aside for the keeping intact of cost. Now, what figures would you adopt if you wanted to keep intact the cost there? Would you adopt the million,

the million five hundred thousand, the two million or would you adopt some figure that some officer of the telephone company would set up on the books, and which you say would have to meet the approval of the Interstate Commerce Commission?

A. I would adopt the figure that met the approval of the Interstate Commerce Commission, because it is immaterial for that purpose in keeping books——

Q. I think you have qualified as an expert who is thoroughly familiar with the uniform system of accounts.

A. Yes, I am.

Q. And right at present the telephone companies are engaged in a wide campaign of merger or consolidation, call it what you will?

A. Yes.

Q. I presume you could then tell me what the elements are that enter into that book figure which the Ohio Bell Tele- [fol. 9222] phone Company would set up for the purpose of depreciation?

A. I have told you that.

Q. No, you have not?

A. Oh yes.

Q. No, you have not. You have simply told me they would set up the book figure, but you have not told me the elements that enter into it or upon what it is based?

A. That, as I say is something else. There are two questions we are discussing, and I think we are being confused. One is the proper figure to set up on the books, and the other is what should be depreciated.

Q. What is the proper figure to set up on the books?

A. I have answered that. I would say if I were faced with the proposition of determining what would be the proper figure to set up on the books, I should have to make some study of the facts and figures in the instant case; I would have to make a study of the situation as it has arisen there; then go to Washington and come back and set up the figures. I would not attempt to do that offhand; I could under ordinary conditions claim to be an expert accountant; so could you claim to be an expert attorney——

Q. No, no.

A. But if you had a problem in patent law that was a specialty, you would go to somebody that understood patent law. Here is a problem that is not an easy one. I would

go to a person competent to solve that problem. That is why we send Mr. Van Zant around.

Q. Don't you expect Mr. Van Zant to be here to tell us how he did make this set-up in Canton?

A. He will be willing to tell you. The books of the Ohio [fol. 9223] Bell Company must show that. You could not put that property on the books without exposing all of the facts in connection with it.

Q. Do you know whether they have shown that here?

A. I don't know anything about the case, other than I have come here to tell you people something about depreciation.

Q. I understand that, and I do not want to carry you on beyond that which you claim to be competent to testify about. But you say you would take the agreement, the consolidation agreement; you would take the books of the two companies, and that you would go over them, or rather you say Mr. Van Sant would do that, and then he would arrive at some figure and go down to Washington?

A. He would arrive at some tentative conclusion of principle.

Q. I believe you have qualified as an expert to the extent you could tell us what are the elements he should consider, and what are the elements that this Commission should consider in determining that very question as far as it applies to the Canton area. It is not arbitrary, is it?

A. No, it cannot be arbitrary.

Q. It has to have some foundation in reason, doesn't it?

A. Yes, sir.

Q. I have supplied you three figures, which are certainly pertinent facts to be considered, aren't they? They are values, aren't they?

A. Well, as long as you treat them as values they have only an indirect bearing on this proposition.

Q. Call them cost figures. You have those three figures [fol. 9224] for the sake of the hypothesis. You say you cannot answer it. It would not be any of the three. It might be something less or more, whatever might be determined on in conjunction with the Interstate Commerce Commission?

A. I don't know that. It might be that he would decide to use one of those three amounts. You say there are no specific instructions in the uniform system of accounts covering mergers as such. There are explicit directions cov-

ering sales and purchases of property. I know in a merger in a general way the idea is to take the fixed capital accounts from the books of the two companies and consolidate them, but how that would arise in a particular merger I do not know.

Q. There is nothing mysterious about a merger. A merger does not add to or detract from the values or the original cost. They are the same, whether you buy for yourself new or whether you buy from another company already used. The original cost is unchanged whether you call it a merger or a sale.

A. The original cost is a fact, and the values would remain the same if you threw all of the books in the river. This is a question of correct accounting.

Q. No, it is not a question of what would be the correct accounting at all. There is where you and I are off. It is a question of what would be the fair basis against which you should figure depreciation. What are you going to seek to keep intact, the million dollars, the million and a half or the two million? And you say you do not care to answer?

A. No, I have given you my answer on that and the only [fol. 9225] answer that can be given. The amount that should be covered by the depreciation charges is the amount which is reflected in the fixed capital accounts of the Ohio Bell covering this property.

Q. You won't say what elements should be considered in fixing that figure?

A. No, sir, not without knowing all of the details.

Q. What other details would you want?

A. I would want to take time to study the merger agreement.

Q. Why? What has the agreement got to do with it?

A. I would want to go back——

Q. Just a minute. You say you would want to go back. What has that to do with it?

A. I don't know.

Q. It hasn't a thing.

A. I don't know. It may have. It may have everything to do.

Q. It is simply the creation of the condition; it might be arbitrary, might it not?

A. You cannot make bricks without straw. If you want to have an accountant set up your books you must supply him the material.

Q. On the other hand any agreement which the Ohio Bell and the Ohio State might enter into in which they sought to determine values would not determine values; as you said before value is a fact?

A. Value is a fact.

Q. And the agreement would not materially assist in determining value?

A. Not as to value.

Q. That is what you are dealing with?

A. No.

Q. Costs?

A. Costs and value are not the same.

[fol. 9226] Q. I abuse the use of the terms. Cost is a fact.

A. Cost is the fact, yes.

Q. An agreement would not determine that?

A. I don't know whether it would or not.

Q. I mean any agreement the Ohio State and the Ohio Bell entered into——

A. If I were going to account for this merger I certainly would not proceed with the accounting without the agreement, without knowing what it did contain.

Q. Any agreement that the Ohio Bell and the Ohio State could not determine the cost to the Ohio State, could it? It could only determine the cost of the Ohio Bell?

A. It could affect the cost to the Ohio State?

Q. It could actually fix it as the Ohio Bell, but could not change in any way the cost of it to the Ohio State?

A. Absolutely, no.

Q. You would not really be concerned in the agreement, would you?

A. I don't know.

Q. All right. The agreement could not fix the actual value of the property, could it?

A. It might attempt it.

Q. It is an arbitrary creation, isn't it? Two parties get together and say, "I will sell," and "I will buy." That does not fix values?

A. It might fix the value as between those two people, but it would not fix the general value.

Q. Assuming that it is a utility, it would not fix it for the use of this Commission or for the sake of the rate paying public?

A. These questions are not accounting questions, I submit, and you are dragging me all over the lot here, and I

[fol. 9227] am not quite sure where I am going, and I do not want to fence with you, but I cannot turn accounting into anything else but accounting.

Q. I do not want to be discourteous. We, too, have been dragged over the lot.

A. You are not discourteous. But I do not want to appear to be fencing with you. If I had an answer it would come like a shot.

And thereupon a recess was had until 1:30 o'clock P. M. of same day. (Friday, April 25th, 1924.)

[fol. 9228] Friday Afternoon Session

April 25, 1924.

And also A. B. Crunden, resuming the stand for further cross-examination, continued his testimony as follows:

Cross-examined by Mr. Kinnison:

Commissioner Poor: Before we start in for the afternoon, shall we decide when to take up this again?

Mr. Dotson: The week of the 12th has time open.

Commissioner Poor: The week of the 12th, the first two days of the week are open only.

Mr. Dotson: Monday and Tuesday.

Mr. Burr: What about next week?

Commissioner Poor: Next week you have the Barberton and Akron valuation protest the first two days, and the rest of the Commission calendar is pretty full there. Let us have this in the record. At this time it is agreed that at the adjournment today the matter will be continued until Monday, May 12th, at 1:30 o'clock P. M., reserving of that week the 12th and 13th, and then looking forward to the reserving of May 19th and 20th, and May 26th, 27th, 28th, and 29th, all contingent upon what progress we are making in the matter.

Mr. Shuler: Have you any further evidence?

Mr. Burr: We may have two witnesses. I am not sure. [fol. 9228½] We may have none.

Mr. Shuler: If the Commission please, I understand these days are set aside for the closing of our cross-examination of Mr. Burr's witnesses?

Commissioner Poor: Well, we do not specify as to what

shall take place, but there is that space of time available to hear this case, whether it is cross-examination or otherwise. When you get through with that we will go into the next stage.

Mr. Shuler: I do not want to be caught in the position, as far as I am concerned—is it the understanding of the Commission, if we get through with the cross-examination on the first two days, we are to go ahead with any evidence we have to offer?

Commissioner Maullar: There may be some redirect.

Mr. Shuler: I do not want to be put in the position where the Commission will say, "We understood Mr. Shuler and the others to say 'We will go on' ".

Commissioner Poor: We want to make just as much progress in this case as we can and take the successive stages as we reach them. This Commission cannot tell whether we will be through with the cross-examination. You lawyers know more about it than we do. If you get through with your cross-examination and then if the next stage is up to you, to produce your testimony, you ought to be prepared to do that.

Mr. Shuler: That is the point we want to get the expression of the Commission on. That is why I asked the [fol. 9229] question.

By Mr. Kinnison:

Q. Mr. Crunden, in offering your testimony in this case, do I understand that the purpose of your testimony was to show the value of the services rendered by that particular branch of the A. T. & T. with which you are connected to The Ohio Bell Telephone Company?

A. Why, I was not consulted regarding the object of the testimony. I take it it is that, at least in part.

Q. You were not consulted concerning the object of it?

A. No, I was simply asked to come out here to describe my work and to describe the method of accounting that I had advocated at Washington—that and various other things upon which I touched.

Q. You do not feel that you have offered yourself as an expert other than for the purpose of testifying concerning the system of accounting which you say you advocated at Washington and within the organization of the A. T. & T.?

A. I am willing to offer myself as an expert to any ex-

tent that I can help any of you gentlemen. And I have told you what my qualifications are. I do not understand the exact import of your question.

Q. I understood you to say this morning, in answer to a question of mine, that you pretended to be well-informed concerning your system of accounting approved by The Interstate Commerce Commission?

A. Yes, sir.

Q. But you went no further than that in attempting to interpret it in the practical affairs of the Company, hav- [fol. 9230] ing in mind the question I asked this morning?

A. I think I can interpret its practical application.

Q. You think you can?

A. Oh, yes.

Q. What did you mean this morning when you said that you limited your degree of competency on the stand by saying that you spoke purely as an accountant?

A. I mean the application of my accounting experince and knowledge to the practical affairs of the company.

Q. In your testimony wherein you have spoken of depreciation you have considered it purely as a problem of accounting, have you not?

A. Yes, I think that is true. Primarily so, at any rate. It may have ramifications but I have been speaking primarily of the accounting aspect of depreciation.

Q. In your testimony I presume, since we were somewhat at cross-purposes this morning, you had in mind, when you testified that depreciation was set up against both costs—you did not have in mind any possible rate base which might be set up by this Commission respecting the value of the property at all, did you?

A. No, sir.

Q. Have you ever considered the relation between the book values of your Company—I refer to The Ohio Bell Telephone Company—which they set up for the purpose of depreciation and the base rate which this Commission may establish as making available more funds or less funds for dividend payments?

(Question read.)

Q. Is my question rather ambiguous to you?

[fol. 9231] A. It is a little. I think I know what you mean, but I am not sure.

Q. All right. Allow me to phrase it a little differently. Assuming that you carry upon the books of your company that cost statement of which you spoke this morning, going back to this hypothetical question which I raised this morning, of a million and a half dollars, as a problem in accounting, you would depreciate against that value, wouldn't you?

A. That being the value on the books, yes.

Q. That being the value on the books; we might assume, on the other hand, that this Commission might place a value of two million dollars on that property; the Commission and the uniform rules of accounting would allow you to hold for your depreciation reserve a fixed percentage of two million rather than a fixed percentage of the million and a half?

A. Upon the books?

Q. No, I would not say upon the books.

A. Now when we talk about the one million and a half and say that that is the value for the purpose of treating depreciation on the books, of course we mean it is the book cost, which is not value in the same sense as the two million dollars found by the Commission would be value.

Q. I comprehend that.

A. Now the fact that the Commission found two million dollars as the value of property which was carried on the books, the fact that the Commission found $2,000,000.00 as the value of the property carried on the books at $1,500,000.00, would not change the books in any way, nor would [fol. 9232] it change the amount of the accounting for depreciation expense on the books.

Q. I still have not presented what I have in mind I see. I am going to say that you carry on your books that value of $1,500,000.00; you are going to depreciate against it, and you set aside, on the basis of five per cent, $75,000.00 annually, wouldn't you?

A. Yes, sir.

Q. Which would be a credit to your depreciation reserve, wouldn't it?

A. That is correct.

Q. The Commission, on the other hand, has determined upon a valuation of $2,000,000.00 as a fair rate basis; upon the same basis of five per cent it would mean you were allowed to set aside to your depreciation reserve $100,000.00,

wouldn't it? I mean in determining that which constitutes a fair return upon the values which the Commission finds?

A. That might be used by the Commission in arriving at what they consider a fair rate to cover expenses and the necessary return, but we would not make charges on that basis on the books.

Q. I understand that. If you will just give me a little time here——

A. Yes.

Q. Here is what I mean to get at, Mr. Crunden. In determining what constitutes a fair return upon the value which this Commission may determine upon, it takes out your items of expense, it allows you depreciation, etc., including all of the charges which may legitimately be made against gross revenue to determine what is net, and in so doing it allows you to depreciate a property which we will say is valued at $2,000,000.00 upon the basis of five per [fol. 9233] cent, and you are then able to charge $100,000.00 to your depreciation reserve, aren't you—or credit, rather?

A. No, that would not change the bookkeeping.

Q. I am not speaking of your bookkeeping. Upon the figures which I have supplied you, $100,000.00 would be entitled to go into depreciation reserve, wouldn't it, because you will depreciate actually for the purpose of a rate case upon the value determined upon by the Commission rather than your books?

A. No, sir, you depreciate according to your books.

Q. For the sake of your books you will.

A. Yes, for the sake of the books. It would not matter what the Commission did, you would still stick to the $75,000.00 per annum. If they allowed none whatever you would have to do that.

Q. The Commission is going to allow five per cent depreciation and the Commission is going to find the value of the property involved is $2,000,000.00; five per cent of that is $100,000.00?

A. Yes, sir.

Q. And that sum of money, of $100,000.00, is entitled to be deducted from your gross income in determining what is net, isn't it, for the purpose of the rate?

A. In the rate case statement?

Q. Yes; is that so?

A. Yes, sir.

Q. On your books, however, you have property listed at a valuation of $1,500,000.00; you are also depreciating on the five per cent basis for the sake of your books, which will give you $75,000.00?

A. Yes, sir.

[fol. 9234] Q. There is a difference there some place of $25,000.00 which has been added as the item which the Telephone Company is entitled to withhold in determining what constitutes a fair return on the rate base, isn't that so?

A. On the assumption that it has, yes.

Q. What actually happens to that $25,000.00?

A. Let us take the next succeeding year and say the conditions turn out exactly the way you expected them to.

Q. No, if you will pardon me, if you will allow me to limit you, just take that one year.

A. You are asking me what would happen. I must go ahead.

Q. I do not think it calls for assumptions. I am interested in that one item of $25,000.00.

A. Will you state your question again, because I thought you asked me to predict what would happen. We are here at a given moment of time, where this arrangement is arrived at, and we look to the next ensuing period.

(Question read.)

A. That depends upon what happens in the next ensuing period. If the expenses are greater in the next ensuing period there may not be any $25,000.00. There may be less, there may be more, than $25,000.00.

Commissioner Poor: He means, where do you put that $25,000.00 on your books; it goes in surplus account or is available for dividends?

The Witness: It does if it eventuates.

Q. It has eventuated. I have assumed it has.

A. I started out to premise that that is what happened. [fol. 9235] You interrupted me. I was going to start backwards perhaps from your point of view and say that in the next ensuing period the Company actually gets the $25,000.00. You wanted to find out what happened to the $25,000.00 if they got it?

Q. I want to know what happened during that current

period for which that depreciation is available under the premise I have stated?

A. If the Company in the next ensuing period——

Q. No, I want that period.

A. That is the period. That is the period which begins this. I will call it present period. We must start at the beginning of the period to look at the period. Now if there proves to be $25,000.00 net revenue over and above what is required to take care of the current expenses and admit a charge of $75,000.00 for the accruing depreciation, the balance would constitute the net income of the Company.

Q. Now do you speak of that $25,000.00 as being net revenue?

A. Yes.

Q. It becomes available for dividends then?

A. Yes, it would under that condition certainly.

Q. Under your uniform system of accounts I believe you are compelled to charge off the depreciation rate as against the amount that you carry upon your books, is that not so, in determining whether there is anything left net available for dividends?

A. That is correct.

Q. If the base which is established by the Commission is in excess of that which you carry on your books, your former answer then means that you will have ordinarily [fol. 9236] more money available for dividends than you would if the amount which you carry on the books and the amount which is determined upon by the Commission are the same from an accounting viewpoint?

A. If everything turns out as was given in the illustration, yes, certainly.

Q. And ordinarily it would be to the interests of the Telephone Company to carry book value less than the base which might be established by the Commission, isn't that so? Otherwise, wouldn't you be hampered in the payment of dividends?

A. No, I cannot say that that would have any bearing on it. I do not think that follows.

Q. You have just answered, haven't you, that the difference between the two would be available for dividend purposes?

A. Yes, but I cannot see that there is any connection there, and there is no proof, to my mind, that the amount

that the Commission would find for what you call the rate base would always be in excess of the books.

Q. I understand that, but I have given you a particular instance where it is, and I have premised my question on that basis.

A. The question is, assuming that the rate base would always be in excess of the amount carried on the books, that it would be to the advantage of the Company, if that was so?

Q. Yes, for the purpose of being able to pay dividends, no matter how small?

A. Yes, that would be the case.

Q. That is to say, that for your net income available for dividends, when the Commission had set up a base of [fol. 9237] $2,000,000.00 and on your books was a million and a half, that $25,000.00 might possibly be the only amount which would be available for dividends; is that not so?

A. Yes, it might be.

Q. Then it is to your advantage ordinarily for the purpose of being able to retain credit for regularly paying your dividends, at least some dividend, although variance continually exist-; is that not so?

A. We are getting now from an accounting question over to a sort of a quasi-legal, quasi-economic question. Now there are other points to it than those to which you are confining your attention, it seems to me. The situation to which you have referred could only come about because of general increases in the value of property which raised the value of this particular property after the time that it had been placed in service. That is, the time it was purchased presumably its value would be what it cost. At some later date, while the property is in service, after a lapse of years, the Commission places a value on that property higher than the cost. That is one of our assumptions?

Q. Yes.

A. There is a piece of property developed for public use which is worth more than what it cost you. Now that property is worn out in operation and the time comes when it is necessary to replace it. At that time the Company will have provided, by charges to expense, an amount equivalent to the loss of the cost of that property, but it will not

have made charges equal to the value of that property, and yet it must then substitute a new item which has that [fol. 9238] increased value. Now where is it going to get the difference? You see what I mean?

Q. That is to say, if the Company continually uses that $25,000.00 for dividend purposes it will finally come to the point when it cannot keep its property intact?

A. Well, if this item of property were a pole which cost $10.00——

Q. Just answer the question, if you will.

(Question read.)

A. It could keep its property intact by spending enough money to keep the property intact.

Q. Where would it get that money?

A. What I mean is, here is a pole which, at the time of the rate case, we will say, is valued at $12.00, and the charges for depreciation through the life of that pole have been equivalent to $10.00. Now the pole is worn out. The Company's pole is gone, and it has to provide, we will say, a new pole which again cost $12.00, and it would then have to go into its pocket to get that other $2.00. The question is whether you are talking about the replacement of the dollars or the replacement of the pole. From the accounting viewpoint the question is confined solely to the replacement of the $10.00, because books are always kept on the basis of cost.

Now we are getting around to the proposition where that pole is admittedly worth $10.00 and it is consumed in operations. At the end of the useful life of the pole $10.00 has been charged on the books which has operated to retain in the business $10.00. But is there elsewhere in [fol. 9239] the undertaking, say through surplus, the other two, or is it necessary then to go out into the investment market and attract in two dollars more to cover the increased cost of the new pole, although there wont be any greater quantity of plant provided for the use of the same number of subscribers?

Now that is not an accounting question. That is a question of whether in a case of this sort we ought to consider the question of replacing the pole with a pole, or whether we ought to consider the replacing of the dollars. Now if that is the same question we were trying to debate this

morning, I can see where we were confused, because I was confining my attention to the accounting.

Q. No, Mr. Crunden, where would you get that additional two dollars you speak of; out of capital?

A. You could get it in two ways. One way would be if the returns during the life of that pole had been sufficient to enable you to retain in the undertaking $12.00, not necessarily by depreciation, but some way, partly depreciation, we will say, and partly surplus, then you would have the $12.00 working capital by the aid of which you could get the new pole. If you had failed to do that to any degree, to that degree you would have to issue additional capital stock.

Q. If you issued capital stock for that $2.00 it would mean that your stockholders had received that $2.00 in dividends and to replace it to your capital account you would have a corresponding capital account of $2.00?

A. It would mean that if you had disbursed that $2.00. [fol. 9240] Q. Then you would have to go out and borrow it or invest new capital, and in that particular case it would show a corresponding liability and the dividend in the mean time would have been paid?

A. It would, assuming it would have been paid. You can see from my standpoint it may not have been paid.

Q. It is available for dividends, and I am assuming in the discretion of the board of directors that they have declared them.

A. Yes, but if, in addition to the fair return, there is only enough to take care of the original ten dollar pole, then of course this other two dollars could not have been paid in dividends.

Q. As a book proposition it is available, and under the uniform rules of accounting it is available at the discretion of the board of directors?

A. The uniform rules of accounting would not have anything to do with that. This is a proposition whether there is enough in the surplus or elsewhere to take care of that two dollars. That is always a matter of fact. You are assuming it is there. That is a perfectly legitimate assumption. I am pointing out it might not be there. That is also perfectly legitimate.

Q. Assuming this $25,000.00 was continually paid, it might finally impoverish the Company, might it not; that

is to say, they were depreciating against a book value when the actual value was in excess of that, and when it came time that they finally had to replace the physical property they would not have the money to do it, would they?

[fol. 9241] A. That would depend upon conditions. I do not think you can draw that conclusion.

Q. You cannot draw that?

A. No; that is a practical proposition, depending on circumstances.

Mr. Shuler: I just want to put into a concrete example this very thing, because I think it is fair to put a hard case to test any kind of a principle. Now I do not hesitate to tell you in the first place why I put the question. My proposition is that by depreciating on your books at five per cent of the book cost, during a period of rising prices the Company does not take out of earnings sufficient to replace the property. That is my first proposition.

Mr. Burr: It does not take out of earnings or get out of earnings enough?

Mr. Shuler: Take or get.

Mr. Kinnison: Or reserve from earnings—withhold.

Mr. Shuler: That in the case Mr. Kinnison had, where a property is valued in excess of its book cost, the Company, Mr. Crundon, produces evidence before the Commission that the present-day value of the property is $2,000,000.00. That the proper annual charge is five per cent for depreciation. If the Commission believes that, they find that value, and, as I understand it, allow as an operating expense five per cent of $2,000,000.00, which is $100,000.00, annual charge for depreciation. Then they say "We will allow you six [fol. 9242] per cent on $2,000,000.00, which is the fair value of your property", and that adds $120,000.00 there. And for the purposes of this illustration——

Mr. Burr: To what do they add it?

Mr. Shuler: You must wait until I finish my proposition.

Mr. Burr: Excuse me.

Mr. Shuler: To that they add—and for the purposes of this illustration we will say that all other operating expenses are $100,000.00. Now I think I have taken care of all charges against the property. Am I right in saying that operating expenses, exclusive of annual depreciation charges, and annual depreciation charges are all the items of expense?

The Witness: You want my reply to that last question?

Mr. Shuler: Yes.

The Witness: Your operating expenses and fair return are all that are necessary to provide for——

Mr. Shuler: No, I say this, operating expenses, exclusive of the annual depreciation charge, and the annual depreciation charge are all the items of expense?

The Witness: Yes, sir, that is correct.

Mr. Shuler: Now, in this case there are operating expenses exclusive of annual depreciation charge of $100,000.00; the annual depreciation charge, being five per cent on a two million dollar valuation found by the Commission as a rate base, is $100,000.00; therefore the total operating [fol. 9243] expenses are $200,000.00. Now the Commission wants to give the Company a fair return on the fair value of its property and it finds that that fair return at six per cent is $120,000.00. Therefore they allow a rate to the utility which will produce a revenue of $320,000.00?

A. Yes, sir; that is, on the assumptions that you have made, that will produce not less than a fair return.

Q. Precisely so, nor more than a fair return?

A. Nor more than a fair return.

Mr. Burr: That is assuming that six per cent is a fair return.

Mr. Shuler: Oh, certainly, I am taking this only for the purpose of illustration and not for evidence or argument or anything like that.

Q. Now that is the Commission's side of the case, the accounting. The Company has actually received dollars from its rates during the year amounting to 320,000. The Company, the utility, has paid out in operating expenses, exclusive of the annual depreciation charge, $100,000.00. You, as an accountant, take out of those dollars 75,000, being five per cent of the book cost of $1,500,000.00. Now you, as the accountant, deduct from $320,000.00, total gross revenue, $100,000.00 operating expenses, exclusive of annual depreciation charges, and $75,000.00 annual depreciation charge, which leaves you $145,000.00 for dividends or any purpose the Company wishes to devote it to; is that correct?

A. Yes, sir.

Q. Now in this Company, just for the purpose of putting [fol. 9244] a hard question to test a principle, that goes on

for ten years. At the end of ten years, prices in the meantime having gone up, you have taken and credited to the Company five per cent of the book cost of the property ten years ago, but to replace the property will require more money today because prices have gone up; and having used up for dividends all the money that the Commission allowed you as an annual charge, being five per cent of $500,000.00 more than your book cost, the Commission allowing you five per cent of $2,000,000.00, your book cost being $1,500,000.00, you have paid out in dividends $25,000.00 a year more than you have put into your depreciation reserve or fund, while the Commission allowed you $100,000.00 to be used to take care of your property; now at that time you arrive at the situation you just spoke about; the pole cost $10.00, and the new pole costs $12.00. You have to get additional capital to buy the pole, and you said you could get this $2.00 to add to your capital by selling stock at $2.00 and it goes into plant new, and then doesn't it become a fixed charge, a fixed capital charge, in the future for rate making purposes—that $2.00 additional?

A. Well, on the assumption that we have been making, there would not be $2.00 additional as a capital charge because you have been getting a return of $12.00 right along.

Q. Yes, precisely so. The corporation has been getting it, but it would not use it to take care of the $2.00.

A. Because you only depreciate in your books at five per [fol. 9245] cent on the $10.00.

Q. And took the five per cent on the $2.00 for additional dividends?

A. In the assumption.

Q. Yes. Now I will admit if, instead of paying out each year as additional dividends that $25,000.00 which the Commission has allowed you as an annual depreciation charge, that $25,000.00 excess over what you actually put on your books, you had put that $25,000.00 in a surplus account and paid for the extra price of the pole out of that, nobody would have been harmed. Now isn't this true, that utilities frequently, as a matter of bookkeeping, do not credit up to the depreciation account the amount they are supposed to in order to make a showing of earnings that do not actually exist? Is that a clearly understood question?

A. I think there have been cases like that. I do not think you could accuse the Bell System of such practice, but I

think I could point my finger to corporations who have done that.

Q. You could put your finger on one Bell Company that has done it?

A. No, I don't think so.

Q. Don't you remember the Michigan case?

A. You are referring now to my Washington testimony, aren't you?

Q. Yes.

A. I do not feel that there is any opprobrium attaching to me or the Michigan Company with respect to what was done there, and I do not feel that the failure to comply with the Interstate Commerce Commission's instructions in that case was anything more than a technical proposition, be- [fol. 9246] cause there were numerous circumstances I could go into if it were pertinent which would show that I was entirely in the right in what I did.

Q. I don't want to cast any opprobrium on you.

A. Oh, I know that perfectly well. You know I bared that case pretty frankly at Washington.

Q. I want to get it clearly in my mind again. Book cost as shown on the books of the Telephone Company, the Bell Telephone Company—does book cost mean original purchase price?

A. Generally speaking it means that. That is, to the corporation that takes the property on the books.

Q. Yes, but I am talking about any Bell Associated Company. Would its book cost reflect the actual original purchase price?

A. Of purchased property?

Q. Yes.

A. Yes, its fixed capital accounts would include that amount unless the price paid for some other going and completed telephone property were in excess of the appraised structural value of such property at the time of purchase.

Q. No, I am not speaking of a merger. Let us get away from consolidation.

A. All right. But this is talking about a constructed plant.

Q. Yes, a constructed plant.

A. The amount placed upon the books in the fixed capital account would be the actual amount incurred in that.

Q. And as purchases are made they are put into the books at that price?

A. Yes, purchases of material for constructing plant.

[fol. 9247] Q. Yes, and equipment; that is the reason I am pretty careful, and want to be careful. You seem to say constructed plant. I want to know whether or not that is true of equipment?

A. Yes.

Q. Somehow I have obtained the impression that every year or two, due to removals, property may go into the fixed capital account at a price prevailing at that time, and if the prevailing price at that time is higher than the original cost it goes in at that original price?

A. The explanation of that is this, that as to a certain amount of telephone material there is a re-use. The re-usable property is almost entirely station apparatus, with a very small amount of plant of all other classes; so that it is principally a proposition of station apparatus. Now, station apparatus, when it is taken out of plant, is returned to the storeroom and its parts are taken down. The equipment is unassembled or disassembled and the various parts are placed in different bins preparatory to going through a process of repair and renovation. Many of those parts are found in a position where they must be junked and others are refinished and come out as good as new, where they are, in fact, undistinguishable from new. Now from time to time these parts are taken out of this bin where old and renovated parts are commingled, and assembled into instruments which are for all practical purposes new instruments. It is impossible to tell from the examination of an instrument whether it is partly used. And because of our inability to individualize those items for the time, because of [fol. 9248] their physical condition, and because of the great number, which would render the accounting burdensome, we treat all items at the corresponding price of the item used.

Q. Is the same thing true of poles and wires?

A. But to a limited extent, because poles and wires are not used anything like the extent stations are. It is a negligible proposition as far as poles are concerned. Many poles taken out of plant are fit for re-use, but they are cut off and shortened and we wipe off the difference in the valuation of the pole.

Q. Then the books of the Bell Companies do not precisely

or exactly reflect the original cost of the property in plant?

A. No, there is that exception which is allowed in the system of accounts, which is that you shall put in this reusable material at its second value; it does not say you must perpetuate an original cost where on the obvious face of things it is impossible to do it.

Q. Then if in a rate case the Court has held that original cost is an element to be considered, to the extent that you have explained the books of the Bell Company would not reflect the original cost?

A. Theoretically they would not, but neither would they reflect it with regard to other property, such, for example, as purchased property where we had placed upon our books less than the original cost. Furthermore, it is impossible to perpetuate exactly the original cost because of the innumerable petty retirements which must be treated on averages, [fol. 9249] and the point that you make would, in practice, be an entirely technical one and would have no substantial practical bearing on the matter.

Q. You have answered it, Mr. Crundon.

A. We get it as near as it is humanly possible to get it. I do not want to leave a false impression. I do not want you to think our books are substantially off original cost. They are so near original cost that you cannot tell which way the error lies.

By Mr. Kinnison:

Q. Mr. Crundon, going back to my question this morning, when certain properties were merged into the Ohio Bell, the old Ohio State property being one of them, assuming that the Ohio State property was in quite a depreciated condition when that merger occurred, what would you do in the matter of accounting and attempting to restore that property upon your books to take care of the depreciation accrued when you did not take over any depreciation reserve?

A. In the ordinary merger, as far as my information goes, we would simply combine the two sets of books; that is, we would take the plant accounts and add them together and take the reserves and add them together.

Q. That is, assuming you took over the reserves of the Ohio State, your answer is yes?

Mr. Burr: May I ask a question while you are waiting there, apropos of Mr. Kinnison's questions to you at the

morning session, and particularly with reference to what you would do, what you said you would do in setting up a [fol. 9250] book figure for the proposed property as the result of a merger or a consolidation; isn't that true——

Mr. Kinnison: We object to that form of question. Let him tell what he would do.

Mr. Burr: Take out that, then. You said, I believe that if you were going to set up a book figure for the property of the Ohio Bell Company as a result of the consolidation between the old Ohio Bell Company and the Ohio State Company you would consult with the Interstate Commerce Commission on the subject; that is correct, isn't it?

The Witness: Yes, if the proposition involved anything more than the most obvious accounting.

Mr. Burr: Now, has the Interstate Commerce Commission issued instructions to the telephone companies as to how properties purchased, not acquired by consolidation but purchased, by a given telephone company would be placed on the purchasing company's books?

The Witness: Yes, sir.

Mr. Burr: Have they given any instructions, so far as you know, general instructions, as to how that shall be done in the case of a consolidation?

The Witness: Not to my knowledge, no.

Recross-examination.

By Mr. Dotson:

Q. I would like to ask, Mr. Crundon, if additions and [fol. 9251] withdrawals from the depreciation account yearly are equal, the depreciation reserve would remain a constant quantity, would it not?

A. Yes, sir.

Q. Referring to your Exhibit No. 21, you have a curve of realized depreciation in connection with your annual expense of depreciation curve for the condition of the plant remaining stationary; then the amount below the six per cent line and above the curve of realized depreciation would just equal depreciation reserve, wouldn't it?

A. You mean it would equal the addition to the reserve in respect to years. You see this is the proposition that shows the annual percentage illustrated by curves.

(Question read.)

A. Well, this chart shows the amount for the respectively individual years. This is not a chart that covers the accumulated depreciation reserve. For instance, there is six per cent for the static plant and there is annual realized depreciation of five per cent when the plant grows five per cent per year in this illustration. So the difference between the two illustrates the difference in the annual percentage and not in an accumulated reserve.

Q. Let us look at it this way then. Taking those lines as they appear in this chart, the sum of all of your credits to the depreciation reserve is the total area under the six per cent line up to and including the year under consideration, is it not?

A. I think that I will give you an answer that is roughly correct if I say yes. But of course you understand that [fol. 9252] those percentages are applied on the plant of the respective years, so that they are moving percentages. With that proviso, that is all right.

Q. Take any year that appears at the bottom of your exhibit, drawing a straight line up to the six per cent you have got the result I spoke of?

A. Yes, sir.

Q. For that year?

A. Yes, sir.

Q. Then your withdrawals or debits to the depreciation account is the area under the curve of realized depreciation up to and including the year under consideration, isn't that true?

A. You mean cumulatively.

Q. Yes.

A. Well, that is a false way of looking at it, because of the variation in percentages.

You have a moving base, namely your plant account, and five per cent of the plant account in one year would be different from what it was in another year, so you cannot talk about areas in this chart. You can only talk about lines, lines either horizontally or vertically.

Q. Those lines represent a constant condition based upon the elements considered in making them, as I understand, after they strike a direct level. Now, isn't it true then that the difference of these areas equals the balance in the depreciation account at the time under consideration, any time you select?

A. Well, I can only answer that by saying that such areas would reflect such amounts providing that this chart were based cumulatively on dollars instead of on annual percentages, and then it would reflect an area in dollars for the exact time you speak of.

[fol. 9253] Q. That is what I mean.

A. I am objecting to the use of a ratio chart for the purpose of making an illustration that is based on cumulative quantities. That is all. It is just a technical point.

Mr. Dotson: That is all.

Cross-examination.

By Mr. McConnaughey:

Q. On Page 594 you are describing the book entries with reference to depreciation. I should say 595, at the top of the page: "The reserve for depreciation account is carried on the liability side of the balance sheet. When the automobile is retired you offset those two items, that is, you credit the plant account and debit the reserve account. That results in cancelling the whole transaction out of the balance sheet."

A. "Just as though it never existed."

Q. And on the preceding page, commencing at the bottom of 593, you say: "At the end of a certain length of time the item of property or the class of property to which the debits and credits have related will be retired from service and at that time the amount at which such items stand charged to the plant account should be credited to that account, the salvage should be charged to the supplies account or to the person who receives the salvage, and the balance, representing the loss, should be placed in the reserve account and offset against the reserve, and it is finally wiped [fol. 9254] out, and therefore all recognition of the depreciable unit or item of property disappears from the books." Now it seems to me that the item of salvage is still in that depreciation account, according to that statement, although you say that the depreciation item is entirely wiped out with reference to that particular unit. What is your explanation of that?

A. Well, what happens is this; let us assume that the proportion of the property that is consumed in operation is 60 per cent of the total, and that the salvage is 40 per cent. Now the amount to be written off is 100 per cent. In

practice we credit the plant and charge reserve with 100 per cent. That is an incomplete transaction so far. We credit the reserve with the salvage of 40 per cent and debit the person who receives the salvage. That leaves 60 per cent in the reserve. The reserve has in that way been used as a sort of wash account to wash the salvage off as against that part of the original cost which is not consumed in operations. In that way we have brought down the 60 per cent, which is the consumable outlay, and that is extinguished against the 60 per cent credit balance, which has been raised in respect to that item, and if that was the only item involved in the reserve for depreciation, the reserve for depreciation would be wiped off of the books.

To clear you up, Mr. McConnaughy, a little bit in regard to our practice in that respect, we could equally well keep the salvage out of the reserve account entirely. It is purely an accounting mechanism for convenience that we ever let [fol. 9255] it get in there. We could do it more simply, and, from the standpoint of the layman, more rationally, by consuming the reserve credits equal to 60 per cent, and when we wipe off the 100 per cent entry charge the 60 per cent against this item in reserve and charge the 40 per cent against the person who receives the salvage or the storehouse. That would give you the same final accounting result.

Q. I do not get from your statement just when you get rid of this 40 per cent in the depreciation account.

A. Why, you get rid of it at the time that you make the entry which credits plant and charges reserve.

Q. That is, you charge 100 per cent at that time?

A. Against the reserve. We charge the reserve with 40 per cent more than is set up to take care of it, but we only do it that way as an accounting convenience.

Q. That is, you assume and try to so plan that the depreciation reserve only includes the amount of the property, less the salvage, to start with?

A. Yes, sir.

Recross-examination.

By Mr. Shuler.

Q. Now, Mr. Crunden, I want to ask you just one more question, I think. You were asked this question on page 628: "Is it the theory of the true depreciation that you seek to

amortize the loss of your original investment?" And you answered: "Yes." On Page 636 you were asked this question, at the bottom of the page: "Your method is the proper [fol. 9256] method of depreciation to keep the investment intact, is it not?" Your answer was: "Yes, sir. By investment I assume you mean there the book cost of the property?" I said "Right." Now, also, depreciation, you say, is returning to the company the loss by use of its property; isn't that right?

A. From the accounting standpoint it is the cost of property consumed in operation—just exactly what is meant by those two quotations.

Q. Now, if that is the true rule of depreciation, why should ever any depreciation be allowed on any other sum than the book account? That is, in fixing an annual charge for depreciation, why should the rate of depreciation be based on any other sum than the book cost?

A. Well, for purposes of bookkeeping, it should not.

Q. Why should it in a rate case, or can you give us any idea of why it should be in a rate case?

A. Well, as I said a little while ago, I think that is a quasi-legal, quasi-economical proposition and it goes back to this proposition——

Q. Let me just——

Mr. Burr: Let him go ahead.

Mr. Shuler: I was going to ask him a question and I think he could explain both.

The Witness: There is a good deal to be said on both sides of the question.

Q. I was going to put another question to you so that you might elaborate the whole thing at once. Supposing the Commission should find the value of the property less than the [fol. 9257] book cost as a rate base; you would still have to charge in your books five per cent of the book cost, wouldn't you?

A. Certainly.

Q. And if it allows you a depreciation on a greater amount than your book account, you only put into the depreciation reserve the five per cent on the book cost?

A. That is correct.

Mr. Shuler: That is all.

Mr. Burr: Do you know whether or not The Ohio Bell

Telephone Company's books are kept in such a way as to show the book cost of the Ohio property by exchanges?

The Witness: My opinion is that they are not, but I cannot state positively.

Mr. Shuler: It is, as a matter of fact, as to Cleveland?

Mr. Burr: It is not.

Mr. Shuler: In Cleveland you keep it separate, the Cleveland exchange.

By Mr. Kinnison:

Q. Do you know from what revenues you have the money available for the purchasing of patents, that is, the A. T. & T.?

A. No, sir.

Q. You do not know from what funds that comes?

A. No, sir.

Q. You do not know what proportions it runs into?

A. No.

Q. You do not know what values the A. T. & T. sets upon them upon their own books?

A. No, sir.

Mr. Kinnison: That is all.

[fol. 9258] And also ARCHIBALD J. ALLEN, recalled as a witness for the purposes of cross examination, continued his testimony as follows:

Cross-examined by Mr. McConnaughey:

Q. Mr. Allen, have you your Exhibits here, copies of them?

A. No, I have not.

Q. Have you a copy of your Exhibit No. 1, the photograph of the exchange?

A. Yes, sir.

Q. Now, referring to your Exhibit No. 1, this is a photograph of an A switchboard, with subscribers' answering jacks, out trunk multiple and subscribers' multiple; on the upright style strips which you describe as numbers designating the multiple, the highest number is 79, is it not?

A. I think so, yes.

Q. State what the total number of lines is that can be called directly from that switchboard?

A. The total number of lines are the lines from zero to 7900 or 7,999.

Q. That is the capacity of the board then, is it?

A. That is the capacity of this board as laid out, yes sir.

Q. Now, there are some blank strips above the multiple jacks in each panel; could those be filled with additional jacks?

A. Yes, they could be filled with additional jacks.

Q. How many more do you have?

A. About three more, possibly two more rows of hundreds.

Q. About three hundred then?

A. No, it is an A panel.

[fol. 9259] Q. 2400 then?

A. Yes, sir, approximately.

Q. Then the out trunk multiple jacks are located where?

A. They are located in the face of this switchboard just above the answering jacks.

Q. Is that space filled as the board is laid out?

A. It is filled but not completely in use.

Q. Could there be any additional multiple added in there?

A. Additional trunks can be put in use in this board as laid out, and when all of the trunks in this board were used up, the additional out trunk multiple could be installed, removing the lower strip of subscribers' multiple.

Q. Couldn't subscribers' multiple also be put in place of those out trunk multiples?

A. Certainly. If you do not have to have that out trunk multiple and your answering jack space at the bottom remain the same as it is in this Board, which by the way, would not be true; if this was a board which had no trunking, you would need more space for the answering jacks, and it would not follow that by removing these trunks you would necessarily lower your subscribers' multiple. You might have to raise your answering jacks.

Q. Then the total maximum capacity of that Board to which it might be increased would be about how many?

A. Well, that, Mr. McConnaughey, would depend on the calling rates, which would——

Q. I am speaking of the capacity of the board, the physical capacity of the board, leaving out the trunking altogether.

[fol. 9260] A. Well, as a very general proposition, a traffic engineer would have to have the basic data as to trunking and various features of that kind.

Q. Leaving out trunking?

A. Physically we could add two more strips. Whether it would be economical to do it would have to be studied.

Q. But you do think that that board might be increased to a total of 2400 in addition to the 7,999 that are now there?

A. Yes, it might not be economical to do it but physically they could be put in there.

Q. That would depend upon a number of conditions that we are not now taking into consideration; just the capacity of the board we are now talking about. Completing calls in an A board as compared with trunking to a B board is distinctly economical, is it not?

A. It takes less operating expense.

Q. In about what ratio?

A. The work on the call at the local multiple assumed to be a unit of one, the call at the trunk would be 1.5.

Q. Where is the saving, on the A board or on the B board?

A. The saving on a call would be both at the A and B board.

Q. How would you divide it between the two, that is, what would be the saving on the B board?

A. We would have to have traffic data in order to determine that, that is, the B load would be determined on the basis of the number of incoming calls from the various offices. The exact amount of work in handling B calls varies [fol. 9261] according to certain traffic conditions, number of incoming offices on the B board, so that it could not be answered as a general matter.

Q. What determines whether a B board should be supplied in a given instance?

A. The general fundamental plan conditions of the city or its geographical lay-out. There are many factors that would have to be considered by the engineers in deciding whether or not there should be more than one office in the city.

Q. Well, what does the multiple jack limit have to do with it?

A. Well, when we get more lines than could be handled in the multiple jacks of one board, we would then necessarily be driven to the proposition of trunking calls. That is one element that would lead to trunking.

Q. What is the limit that would be handled on one multiple board?

A. That would depend on the calling rate, which would, as I have said before, show us how much space we would have to use for answering jacks, which would be primarily—we must have the answering jacks. The space left after that can

be used for other purposes, completing calls or trunking, depending upon what the conditions are.

Q. Assuming a calling rate of ten for an average—what do you mean by the calling rate?

A. The calling rate is used in various ways. Calling rates are used for various purposes. We have a calling rate per station, a calling rate per line, various things. It means generally the number of originating calls from either a given [fol. 9262] number of stations or a given number of lines.

Q. Now, what calling rate do you have in mind when you use the words as you have just now?

A. I haven't any. I am open to any suggestions.

Q. Is it a calling rate per line or a calling rate per station?

A. In engineering a board ordinarily the calling rate per line during the busy hour of the day.

Q. Assuming a calling rate of ten per line?

A. That is an engineering study on which no traffic engineer would give you an offhand answer. It is a matter of considerable engineering to lay out a switchboard. I would not attempt offhand to state. I will give you a general answer, but I would not want you to take an offhand answer. But I would assume that we would use up something in the neighborhood of possibly from 100 to 120 answering jacks per panel, and that having used that and having left sufficient space in our out trunk multiple to handle calls going to the toll boards and going to the information boards and various conditions of that kind, which vary somewhat between cities, I might assume that we would probably have to leave three or four strips of jacks—on the average I do not think it would be much different from what this board is.

Q. That is a fair maximum board, isn't it?

A. I should say ordinarily that would be.

Q. Ordinarily that would be about the maximum size of the board?

A. It would not be far from what you might get as the amount of subscribers' multiple. It might be one strip [fol. 9263] less or one strip more.

Q. Does that include the 2400 additional that you admitted might be put above the multiple jacks shown there?

A. No, sir. I think the reason there isn't any more in this board is that the reasonable reach on the part of operators was reached at the point that is shown there.

Q. That is one of the determining elements in laying out a board?

A. Yes, we have to take the girls as we find them.

Q. Now, when a B board is supplied it not only requires the extra operating expense for the additional lines, but the necessary trunk jacks crowd off of the board some of the multiple jacks that there was previously room for; is that correct?

A. No, I would not say that because the mere fact that our trunking calls has reduced the necessary amount of answering jack space would probably give us enough room for the trunks.

Q. Taking an A board by itself without any trunking, the number of operators' positions is determined by the number of calls an operator can answer and the number of calls that are originated on an average by each subscriber's line, isn't it, the capacity of the girl and the demand of the subscriber?

A. During the busy hour, during the busy periods of the day. We have to take a great many conditions into consideration in engineering the board.

Q. With reference to the capacity of operators, you have used two or three different figures in the record, perhaps [fol. 9264] in different senses, with reference to the number of calls per hour that an operator can handle. On page 514 you mention 230 as the capacity, and on page 487 you refer to one girl handling approximately 150 calls an hour?

A. That would be the difference whether all of the calls were completed into the local multiple or all of the calls were trunked. That is the ratio of one to 1.5, which I mentioned a moment ago.

Q. You say here—this is your language, "One girl can handle say approximately 150 calls," and then again on page 503, if we get to the point of how many units an operator has ordinarily to carry, there we have a very definite idea, and we expect that the average overall load of operators would be around 130 units per employee hour per day?"

A. That reads 230, doesn't it.

Q. It is 130, in the record.

Mr. Burr: From what page are you reading?

Mr. McConnaughey: That is 503.

The Witness: Now, that is an error either on my part or someone else. That should be 230.

Q. Well now, in the other instances you mentioned 140?

A. No, I mentioned 150, didn't I?

Q. 150 I should say yes. Now, what was the difference between those two references?

A. In one case I am talking of units, 230 units, and in the other case I speak of 150 calls, and at that time I was referring to a curve in response to a question by Mr. Shuler, where I presented the curve which was an office with a hundred per cent trunking, and that is about the ratio of [fol. 9265] one to 1.5. To be exact it would be 153 rather than 150.

Q. What do you mean by units; when you spoke of the 230 you said you were referring to units?

A. We have for convenience in working with our traffic arranged a method of reducing all costs to units. That is, for instance, on a given board we have calls from pay stations, calls from subscribers' lines, some of which are completed into the subscribers' multiple. Other calls are trunked. They would not add together to give you anything you could use in a general term, and in order to carry on our business in a smoother way, we have arranged a set of what we call co-efficients, and counted the various kinds of calls and applied these co-efficients to reduce all of the calls to a common unit.

Q. Is that for the purpose of comparison, checking one class of service against another and one accomplishment against another?

A. It is for various purposes. It is for the purpose of laying out the operating force on the switchboard, one of the primary purposes. Another would be the case of engineering the switchboard. And the third would be, as you stated for comparative purposes as to the efficiency with which various offices are being operated.

Q. When you say 230 unit calls you mean you have figured that it is possible for an operator to handle 230 calls per hour; is that correct?

A. Yes, during average busy hours when the board is generally covered with operators.

Q. Now, on page 514 you explain the 230 units per hour as giving 15.65 seconds for an operator to handle a call [fol. 9266] of the unit type, including work time and neces-

sary idle time; does this unit call correspond to the kind of call on which you gave ten second as the work time?

A. Yes, that corresponds to the exact time. In my testimony I did not want to confuse you with fractions. The worktime on the unit call is 10.17 and corresponds to this over all time, including both the work and idle time, of 15.65 seconds.

Q. About one third to two thirds?

A. I think you will find that is 65 per cent.

Q. Well now, do you expect a good operator to keep the pace better than one third of her idle time during her particularly busy hour, letting her relax more when the traffic falls off?

A. It depends somewhat on the type of traffic in the office. If traffic is sustained for a period of three hours, we would not expect the operator to carry the 230 units during any of that time. If for a given half hour during that time the traffic peaks up, we would expect the experienced operator for a half hour period to carry about six and one half per cent more, or at the rate of about 245 units, for not more than one half hour during her half day.

Q. That is about the maximum performance that you would expect? It is the number of calls that an operator can handle during the busy hour that finally determines the number of your operators, the size of your switchboards and other big items of expense, traffic expense, is it not?

A. I would have to split that when I answer it. In answer to the first part of your question, the number of calls that [fol. 9267] the operator can handle during the busy hour would determine the number of operators that we would use during the busy hour.

Q. Yes.

A. But not for other parts of the day. It would also, in answering the next part of your question—the number of units that the operator could handle during the busy hour—would determine the amount of switchboard that it would be necessary to place in the office.

Q. Are there any other items of expense that are dependent on the capacity of the operator during the busy hour that you think of now?

A. There would be certain related items, such as the amount of direct floor supervision, as we provide a certain

number of operators to assist and coach the operators, and they would be reduced in proportion to the A operators.

Q. That is, there are certain incidental expenses that go along with the employment of the operators that would be increased as the number is increased?

A. Yes, sir.

Q. 230 calls represent the load which you reasonably expect the operator to carry on a typical board throughout her working time?

A. 230 units. You keep referring to calls. I am talking units. You will see why, because we might have on one board a considerable amount of trunking, or we might have what we call AB toll traffic or trunk calls; we cannot talk in even terms unless you refer to units.

Q. Well, say units then; that is correct?

A. Yes, sir.

Q. That is, that can be expected as a normal working rate?

A. Yes. There are certain modifying conditions; as you used the term, an experienced operator——

[fol. 9268] Q. Yes.

A. And I am carrying that in my head. If we had a considerable turnover in the city, so that we had a rather large number of inexperienced girls, we would have to reduce the load somewhat to allow for that inexperience.

Q. Now, you were referring in your direct examination, I think, to these units as having been worked out on a particular type of board that you there had in mind, did you not, or is that a general average that you expect on any type of board you may use?

A. The mere fact that we have reduced it to units takes care of that condition. That is a different type of board or different class of calls. In applying our co-efficients or in reducing it to units, we take care of that. We might have this same system of units applied to our toll board. We might have the case where the operators' load consisted of 20 calls in the busy hours. By the application of your co-efficients, you take care of those various conditions.

Q. Of course, if 245 is the maximum number expected per business hour on a typical A board with no trunking, then if it were all trunking, no A multiple, you would expect about how much?

A. If you are still sticking to units we would still expect 245.

Q. I am referring now to calls. Now, you make on a typical A board with no trunk your 245 units, wouldn't you, with your best conditions?

A. We would if traffic was of such a nature that it peaked for a half hour above an adjacent hour.

Q. On the same board if there was 100 per cent trunking [fol. 9269] how many calls would you get?

A. We would get 153 calls multiplied by six and one half per cent.

Q. 153 by 6½?

A. Yes, sir, 153 times 1.065.

Q. Why 153?

A. Because 153 is the number of calls that correspond to 230. The reason I cannot answer you offhand on your particular question is that in the particular department of the work in which I am interested I do not think in terms of 245. 230 on an A board, with no trunking, corresponds to 153 on a board with 100 per cent trunking. Now, those are the loads that are used in the particular work with which I am dealing from day to day. So that I cannot give you offhand the figure that applies to the 100 per cent trunking.

Q. It would be 164 or 5?

A. Yes.

Q. If half of the calls were trunked, there would be a corresponding increase over that number. What would that be—50 per cent trunking?

A. It would be an average between 164 or 5 and the 245. It would be in direct proportion.

Q. That would be about 205?

A. Approximately.

Q. An operator works most efficiently, does she not, on the answering jacks directly in front of her?

A. No, I would not say that. She works with practically equal efficiency on the answering jacks on her own or the adjacent position to the right and left. There is practically no difference on that.

Q. Excepting as she approaches the outside of the right and left board she has to reach a little further; is that the only difference?

A. Yes, and there are certain compensating things. Sometimes the answering jacks right in front of her may [fol. 9270] be so situated that it is awkward to get a cord up and in. It is sometimes easier when a cord is pulled free.

Q. When the traffic falls off you reduce the force and one operator may have two positions to cover?

A. There would be a time with falling off traffic when we would have half of the positions unoccupied.

Q. Yes; then she would have to reach to the right or to the left to reach the positions furthest away. Does that slow up the service?

A. No, that tends to improve it a little bit, because of the fact that the operator on the right and left—those positions are vacated—she can reach freely there. There isn't any other operator that might jar her arm or conflict with her. It improves the condition slightly as far as her working conditions are concerned.

Q. With the result that you can get just as many calls answered by one operator under those conditions as by two?

A. Your question was not phrased as to how many calls would be answered.

Q. No, but I asked you about the ease of operation?

A. Yes, and I answered that question, yes, sir, ease of operation.

Q. Now, how about the other?

A. The operator would naturally handle slightly less calls for the reason, not that the calls would be more difficult or that it would be less easy for her to handle them, but for the reason that there is less team work as given signals come in, and we have to reduce slightly the occupied time [fol. 9271] of the operator, so that there will be an operator available to answer the line signal within a reasonable time.

Q. How much of a reduction would that be?

A. At the time when every other position was unoccupied there would be a reduction of about four per cent in the operators' load.

Q. Suppose you take off two operators, leaving just one third of the force, what difference does that make in the number of calls they can handle?

A. I would say approximately six or seven per cent. In order to be more exact I would have to verify that. You are asking these along a line of figures that we do not use. We have a table which takes care of all of this, and which is in evidence in one of the Exhibits which I put in.

Q. One of these Exhibits which you have put in?

A. Yes.

Q. There is an approximate relation between the number of cords which an operator may have up in the jacks at a given time and the efficiency of the operation, is there not?

A. There again there would be a great many elements to consider, such as the holding time, that is, the length of time of conversation, and various elements of that kind. No, you could not say that there would be a relation between the number of cords and the efficiency of the operator.

Q. Assuming the same board, the same class of service, comparing one time with another, one day with another, [fol. 9272] or something like that, the number of cords she has up at a given time——

A. I think you would have to define what you mean by efficiency in that question. It is a very loose term.

Q. I am not speaking so much of the efficiency of the operator; I should have said the efficiency of the operation. Now, isn't it a fact that there is an unequal number of cords up at a given time shows an improper distribution of calls or the traffic?

A. Oh no, we would not under any condition hope to have an even number of cords. One operator of greater experience might necessarily handle more calls, or on a given position there might be a shorter holding time, which would mean a lower number of calls on an adjacent position with a different holding time. I don't think you could get any relation out of that.

Q. There would be a relation between the efficiency of the operators under those conditions? You say one operator could handle them quicker and faster than the other as one of your conditions?

A. I say if one operator handled more calls than another she necessarily would have more cords on her position, if other conditions happened to remain the same. But I can't see any relation between that and the proper distribution on the board.

Q. Or the efficiency of the operation as a whole? This Exhibit No. 1 shows 17 cord pairs, does it not?

A. That is the standard arrangement generally on boards of that type.

Q. And that is the standard? Why is 17 the standard?

[fol. 9273] A. Because that has been found in general practical operation sufficient cords to handle the calls on the position. It would be uneconomical to engineer different positions with varying pairs of cords, because conditions would change.

Q. Why have they selected 17?

A. Because on the basis of experience and actual practice that seemed to be the right number. That is not true on all types of boards. Other boards have other numbers.

Q. Isn't it true that that is based on the capacity of the operator to take care of them?

A. Very roughly. For instance, whether we are putting a board in in what we term a single office city or a multi-office city, we would not vary the number of cords. We would put 17 cords in in either of those conditions. That is, it would not be engineering economy to try to follow definitely the load with the cords on positions.

Q. Isn't it a matter of fact that 17 is about the maximum number that a girl can handle under ordinary conditions—under any condition?

A. 17 would be a rather high maximum, yes.

Q. You would never really expect to find 17 cords up at the same time?

A. I have seen 17 cords up on positions, not only on one position but on several adjacent positions. But it is not our intention to limit the operators' work by having too few cords. It is exceptional that the operators use the 17 cords.

Q. And if there were 17 up at the same time there would [fol. 9274] be a crowded condition which would bring about bad service, wouldn't it?

A. No, it might indicate a long holding time.

Q. Somebody would have to wait?

A. No, because there would be undoubtedly other operators that could handle the call.

Q. Other operators would have to handle the calls in that case?

A. Yes, sir, and that condition probably would not last more than a few seconds until some of those cords would come down.

Q. Suppose there was just one cord up at each position in an exchange, what would that indicate as to the number of operators?

A. You are speaking all this time of what type of board?

Q. The same type that you testified about awhile ago, Exhibit No. 1?

A. That would be a rather exceptional condition. It would rather be an indication of more than the right supply of operators.

Q. Had more operators than you needed at that time?

A. I would be inclined to think so.

Q. About what number of cords up at each position would you take to indicate that the operators were efficiently busy for an A board?

A. I could not answer that without having the holding times and other data.

Q. The holding time tends to average, doesn't it?

Q. No, we get considerable variations in holding time.

Q. Couldn't you answer that question assuming just an ordinary condition? Suppose you went into an exchange [fol. 9275] and found practically all of the girls with forty to fifty per cent of the cords up, what would you think of that as to efficiency, fine and dandy, like business was good and everything was all right?

A. No, I would take more than the number of cords up into consideration in deciding whether the force was overloaded or not.

Q. Would you take that into consideration at all?

A. Oh yes, there would be no question but what that would be an indication. As I say you would have to have other basic data.

Q. What else would you have to have?

A. The holding time would be the principal other factor.

Q. That is the holding time to determine the number of calls that were being handled, the holding time would affect the number of calls that were being handled; is that what you are getting at?

A. Yes, sir, and other elements such as percentage of trunking, that is, whether the calls were being completed at the local office.

Q. Suppose it was an A board, strictly A board.

A. That is, you mean an A board in a single office city?

Q. Yes.

A. The principal element there would be the holding time, which would have to be taken into consideration with the number of cords up in order to determine whether or not the load was high or low.

Q. Say a minute and a half. Now, the question is assuming a minute and a half holding time and a strictly A board, about what number at each position would you [fol. 9276] take as indicating that the operators were efficiently busy, that is, what number of cords up at a given time?

A. Well, that would be a mathematical calculation, but I would say from my experience that probably an average of about seven cords.

Q. About seven out of the seventeen?

A. Yes, sir.

Q. Ordinarily on such a switchboard even at a busy time you would expect a good deal of variation in the number of cords up, wouldn't you?

A. Yes, sir.

Q. Due to what?

A. Due to difference in holding times on different positions, due to the difference in the ability of the operator manning the position, and various factors of that kind.

Q. Difference in demand of different subscribers?

A. I don't think that would have any bearing on it.

Q. That wouldn't make any difference. You have not only the general peak load for the exchange as a whole, but there are special peak loads for individual operators, aren't there?

A. We have our lines so assigned to the switchboard that there isn't any abnormal peak load. We might have a short space of time when you would get more calls on one position, but the operators on adjacent positions can all work through that position. There is no complications arising from that.

Q. But this assistance that the girls give is not particularly quick or efficient, is it?

A. Yes, I would say it is.

[fol. 9277] Q. It requires the girl that is doing the assisting to look at her own work and the other at the same time, doesn't it?

A. No, it is part of the—she is trained to take calls on her own or adjacent positions, and these supervisory employees are there to see that the girls are working in the right direction towards any slight peaks that might occur. There is no complication from any such source as that.

Q. Don't the girls reaching cords that way tend to more

confusion and collision with each other in handling the calls?

A. There is nothing material in that. They are trained in proper methods of doing that or if necessary in passing the cord to an adjacent operator without either stopping their work on what they are doing, or interfering with the girl. We have instructions covering those points, that it be done in a smooth and economical manner which does not result in confusion.

Q. That assumes, of course, that both operators are well trained and efficient?

A. There are no particular complications in training operators in those elements of work.

Q. With the very best of management and planning in one of these standard switchboards such as you have shown in your photographs you have a great deal of extra equipment and extra operators due to the general peak load of the traffic, and still more on top of that on account of special loads at separate positions?

A. No, my answer to that would be no.

Q. Do you have any extra equipment? You have to pro- [fol. 9278] vide margins of equipment and operators to take care of peak loads?

A. No, other than what I have outlined, to provide enough positions so that we would have——

Q. So that the peak load can be taken care of?

A. So that the load would not exceed the 230 or 240 in a busy hour.

Q. That means, of course, more equipment than if it was all at a steady rate throughout the 24 hours; the fact that there are peak loads calls for more equipment and more operators than if there were no peak loads, doesn't it?

A. Absolutely, yes. There is only one answer to that question.

Q. Now, you have indicated on page 512 of the record something about a condition with reference to the employment of operators. You indicate that you run into periods of prosperity in a city and the girls show a high turnover, so that you have to take on many new girls whether you want them or not, until you can train them to a proper degree of efficiency.

A. Are you referring to page 512?

Q. Page 513. It commences on 512 and runs over to

513. Now, that affects different communities different ways, I suppose, and varies at different times?

A. Yes, sir.

Q. Are you familiar with those conditions in Ohio, industrial conditions, the greatest difficulty in employing operators in a general way and their general disposition or independence after being employed?

A. I am generally familiar with the employment conditions in Ohio, yes, sir.

Q. Now, besides this effect of prosperity on the opera- [fol. 9279] tors, industrial conditions at a given time, there is also the weather, extreme conditions of heat or extreme continued cold or rain or continued good weather that may attract girls outdoors for the summer season, or epidemics or other causes of difficulty of getting and retaining operators, are there not?

A. Those would cause slight variations in the percentage of absenteeism in the offices in question.

Q. And some difference in the ability to employ operators as they were needed?

A. Yes, I think it might have an effect on that. There would be seasonal conditions that would affect employment.

Q. More or less from time to time?

A. Yes, sir.

Q. You would not say that they are slight, would you? Some of them are slight and some of them are rather serious, aren't they at times?

A. Well, I didn't recognize any that you have mentioned that would be serious over any extended period. Of course, we have periods of epidemics, as we have had a couple of times in the past three or four years, but those are conditions which cannot be considered as at all general.

Q. Now, you have to adjust your hours of work, rates of pay, and incidentally your service, to these conditions, do you not, that is, to the kind and amount of service that you can get out of these employees that conduct these operations?

A. Yes, all those matters are considered in both our quota conditions and in our other management problems.

Q. Have you a copy of your Exhibits 8 and 9?

A. I don't recognize those by number.

[fol. 9280] Q. Those are those which show traffic loads in two typical offices?

A. I think so, yes.

Q. You show there 250 calls per hour per operator. Referring now to the typical business office, this shows a peak between ten and eleven, a very sharp peak between ten and eleven, and one of the numbers at the side of that chart——

A. Those are calls.

Q. Calls per what?

A. Calls per hour. They are simply a scale which if you cross until you hit the curve shows how many calls per hour.

Q. It does not refer to the number of calls to be handled; you could reduce that to calls to be handled by a given operator?

A. Yes.

Q. That is what at the peak on that typical day?

A. That would require 90 operators. I have got to reduce that to units.

Q. That is about 250 units?

A. I am assuming that that is 100 per cent, and that all of the calls out of that office are trunked, and on account of the peak being as it is there, would result in handling 245 units during the busy half hour.

Q. It would take two or three extra operators from ten fifteen to eleven wouldn't it, four more from 10:15 to 11:45, and two more from 10:00 to 12:00, for which there would be no work at any other time during the day?

A. No, we would arrange our operating schedule so that we would bring approximately the required number of operators on during the busy period hour; the time im- [fol. 9281] mediately after that to give reliefs to operators who had been working a sufficient length of time; and very shortly after that peak period, we would consider giving lunches to operators who had started in on early tours of duty, so that there would be no excess of operators. We would fit the operators to the requirements during the different hours.

Q. You mean to say you have no extra force during this period from 10:15 to 12:00 because of the time that is taken off for lunch and rest periods and so forth; that your force would be uniform during the day?

A. There would be practically no excess of operators during that period. I have had drawn up a schedule which fits that curve, and which during the whole day shows we

have an excess equal to 22 hours of work, which is 22 hours on a total of something over a thousand hours.

Q. Is that introduced as an exhibit in this case?

A. No, sir.

Q. Will you put it into the record or let us see it?

A. Shall I put——

Mr. McConnaughey: Is there any objection to putting it in the record?

Mr. Burr: No. No objection.

The Witness: I have here a curve drawn up in response to Mr. Shuler's statement that that business office curve would make no difference, that he would schedule operators straight through the day; and I have had a schedule drawn up according to standard methods and another one drawn up according to Mr. Shuler's method, and we would be glad [fol. 9282] to introduce both of those as exhibits.

Q. All right, let's see those.

A. This is an exhibit drawn up according to the standard schedules and shows a requirement of 109 operators to operate the office. This second exhibit is one drawn up according to Mr. Shuler's suggestion and shows a requirement of 120 operators, or approximately 10 per cent additional force; that, if applied to the Bell system operating, would require an additional expenditure of about $14,000,000.00 per year in operators wages.

Mr. Burr: Let the two exhibits be marked Allen's Exhibits Numbers 12 and 13.

And thereupon the paper writings above referred to were marked for the purposes of identification and were offered and admitted in evidence on behalf of the Ohio Bell Telephone Company, and are herewith submitted, marked respectively Allen's Exhibits Numbers 12 and 13, and made a part hereof.

Q. Each sheet is a complete exhibit?

A. Yes, sir.

Q. Mr. Allen, you were also asked for some other data, circulars or reports showing the results of your studies on the basis of the instructions you have issued are now in force in the various associated companies on the effect of loading. "We have these circulars similar to the ones I

entered here." You were asked to produce some of those circulars?

A. As I take it this schedule here is in response to that. [fol. 9283] It answers that request. It is answering Mr. Shuler's argument, yes.

Q. The next one is a request that you furnish, referring again to the reports on loading—"Will you furnish those reports for the cities affected in this hearing?" Have you that data?

A. No, I think I stated in response to that question that that data was available here in Ohio.

Q. From the officers of the local company?

A. I did not agree to bring any data of that kind.

Q. "We would like to have them from the General Staff; also when it comes to cross-examination, we would like to have you prepared to furnish us full and complete information with reference to the LaCrosse and Wilmington boards, about which you have testified." Have you that data ready?

A. I was not asked for anything in my testimony of that kind, was I?

Q. No. What is the difference between Exhibit 12 and Exhibit 13?

A. Exhibit 12 is a schedule drawn according to our standard routines as set up in traffic circular 117, which was introduced as an exhibit; and Exhibit 13 is a schedule drawn up according to the suggestion made by Mr. Shuler that the correct method would be to schedule particularly the same number of operators throughout the day in this business office.

Q. And you say that it shows a difference between 120 and 109?

A. The lower left hand corner of the schedules you will find it totaled.

[fol. 9284] Q. Now, you think that is the best possible arrangement of operators through the day and it is the way you would do it normally?

A. Yes, we have in all these matters two things to consider. One is the number of operators required during the different hours. The second is the assigning of reasonable tours of duty to the operating force. In this particular office, it is difficult to build a schedule, and such excess hours

as we have are due to the difficulty in covering the requirements and giving the girls reasonable tours of duty.

Q. Now, each one of these horizontal lines represents one employee, I assume?

A. The horizontal lines are shown on there for the tours of duty which are permissible in that office, and at the left of the horizontal line is a figure showing how many, if any, girls are assigned to the particular trick indicated by the horizontal line.

Q. What is the dotted line?

A. The dotted line is a permissible trick, but not to be used unless it cannot be avoided.

Q. Then on this Exhibit 12 the number 4 to the left of the vertical line indicates that there should be four on that trick; that is, four from seven to——

A. I do not find that figure on mine. Those numbers that you are indicating as on the line are the times at which the operators working that particular tour of duty are given their fifteen minutes relief for the first half of their tour of duty; of the six operators who work that tour of duty, four of them received fifteen minute relief duty during [fol. 9285] this 15 minutes; two received a fifteen minute relief period during the next. Later on at that period you will see six, and that indicates the time at which the six operators working that tour of duty are given their lunch hour, and further on on that same line you again come to the figure six, which indicates that during the afternoon all six of those operators are given a fifteen minute relief during the period from 2:30 until 2.45 P. M.

Q. What are these numbers here on the lines to the right?

A. On the lines to the right about the middle of Exhibit 12 are shown letters which indicate that that particular half of a trick can be assigned to a girl who works a tour of duty towards the left of the sheet, having a corresponding letter. In other words, the tour at the top having these letters can be assigned to any girl who worked tricks capital A, capital B, capital C, capital D, or small a at the left of the form.

Q. And that gives how many hours work per day to the operators?

A. That assigns eight hours of work to the operators who work on day tours and seven hours of work to operators who work part of their time during the evening.

Q. That is uniform is it?

A. No, that is not uniform. There are some cases where in some places in smaller cities the operators work different hours of duty, and in some cases where the evening operators work eight hours the same as the day operator. But this is one of the forms, and drawing the schedule on any of the [fol. 9286] other standard forms would make no material difference.

Mr. Burr: May it be understood that Allen's Exhibits Numbers 12 and 13 are made a part of the record?

Mr. McConnaughey: Yes, sir.

Commissioner Poor: We will adjourn at this time until May 12.

And thereupon the further hearing of this matter was adjourned to Monday afternoon, May 12, 1924, at one thirty o'clock.

[fol. 9287] Monday Afternoon Session

May 12th, 1924.

And thereupon the further hearing of this matter was resumed pursuant to adjournment.

Present:

Karl E. Burr and Charles S. Maltby, on behalf of The Ohio Bell Telephone Company.

W. S. McConnaughey, and J. B. Harshman, on behalf of the City of Dayton.

T. H. Miller, on behalf of the City of Canton.

Henry M. Hagelbarger, on behalf of the City of Akron.

Frank F. Gentsch, on behalf of Certain Protestants.

Commissioner Poor: The matter set for hearing this afternoon is the further hearing of the tell rate case.

[fol. 9288] And also ARCHIBALD J. ALLEN, resuming the stand for further cross-examination, continued his testimont as follows:

Cross-examined by Mr. McConnaughey:

Q. Mr. Allen I want to ask you a few questions about Exhibit 12, which is an exhibit showing the arrangement of

operating forces, typical business office. I understand by that that that is a typical central office where 99 per cent of the business is business houses?

A. That is where the stations are stations in offices or business houses or of that nature.

Q. Now at the top and to the left of this sheet as it is arranged here there is printed "Operators requi-ed," and opposite that a series of numbers. I understand that to be the number of operators required in each half hour period in the day?

A. The number of operators required at the switchboard during each half hour of the day, yes, sir.

Q. The next is the number of operators provided. Now let me ask you, is this exhibit made up from an actual office or is it something you have arranged to illustrate the point that you are making with Mr. Shuler in your direct examination?

A. No, this is data from an actual telephone office.

Q. Yes, that is what I understood. Then on this day there were provided each half hour the number of operators shown in the second line; that is correct, is it?

[fol. 9289] A. On this example which I am putting down here, that number is provided.

Q. Yes, that is what I understand; and the third column is the number that are available for relief and lunch period during each half hour?

A. Yes, sir.

Q. And that would be the difference between the first column and the second column?

A. Yes, sir.

Q. Then in the next column you show opposite the word "lunch"—what is that time, lunch?

A. That is time required.

Q. Time required for lunch and time for relief, I see.

A. Yes.

Q. Time required for lunch. You show a series of figures; what do they represent?

A. That is the time that different operators are away from the switchboard for their lunch period.

Q. And during that time operators to relieve them are supplied from these that are available for relief and lunch as shown in the other column?

A. That is correct.

Q. And the same is true with reference to the line showing numbers for relief?

A. Time required for relief, yes, sir.

Q. Down at the bottom is the line opposite "excess," and that shows number of operators in excess of what is required for all purposes in each half hour during the day?

A. That is correct.

Q. That is the way it is arranged?

A. Yes, sir.

[fol. 9290] Q. Now take the first column, or the first line, operators required, the second number, 19, in that line, and in the next line, that means that there are 19 operators required during that half hour, as I interpret it?

A. That is right.

Q. Immediately underneath is the number 51 operators provided. That means that in that half hour you have 32 more operators than are required; is that right?

A. Yes, sir.

Q. And at that time during that same half hour there were only 4 to be relieved?

A. That is correct.

Q. So that that left an actual excess of 28 at that time?

A. That is right.

Q. As shown by the last column?

A. Yes, sir.

Q. And you actually did have those 32 extra operators there available?

A. Yes. I presented this exhibit on which this is based to show that it was the most difficult type of a curve to draw a schedule to fit, and that it would, if carried through, result in conditions of this kind and when we actually had the schedule worked out it did result in a considerable excess number of operators hours during certain periods of the day.

Q. This is your own operating schedule, the schedule you made out according to the methods that your department works out and recommends to the Associated Companies, isn't it?

A. This is not a schedule that we would use in this office. We have found that in offices of this kind it is advisable to [fol. 9291] make a change in the standard conditions whereby we provide a considerable number of operators working with a half hour lunch period instead of a one hour lunch period. That works to advantage from the fact that

in a section of a city where all of the business is of a business nature there is practically nothing for the operating forces to do during a lunch period, and they much prefer to work, have a shorter lunch period of one-half hour and on that basis get through earlier at the end of the day. The difficulty in drawing this schedule, as I have stated in my direct testimony, is the fact that we do not have enough falling off in telephone business during the noon hour so that it is possible to get a one hour lunch period for the operators without having a considerable excess during the different periods of the day. This excess, if I understand the questions you asked me a short time ago, has nothing to do with the question of whether we have distribution of traffic or do not have distribution of traffic. This is a condition that exists in this typical business office where we have this peculiar condition. There are only a very few offices of this kind. Say in a city like Columbus there would be none of them; in a city like Cleveland there would be probably two or three. It is introduced to show that situation in this type of office.

Q. You call this a typical business office, Mr. Allen?

A. Yes, sir, it is typical of an office of this nature of a business office, but I was trying to help you out by saying that [fol. 9292] it has nothing to do with the proposition of whether we have distribution on the board or not.

Q. Do not try to help me out any more about that because that is not what I am after at all. I am not interested in that at the present time. I am just trying to understand this schedule. That is all. Now in that half hour and in the next half hour you had 28 operators in excess of what you needed? That is correct, isn't it?

A. That is correct.

Q. And in each of the half hour periods during the day you had the number of excess operators shown here?

A. In each of the half hours when there was any excess of operators it is shown here.

Q. Yes, that is right. That is what I mean. And a total for the day of 62½ hours out of a total of 718. That is operator hours; is that correct?

A. It is a total of 62½ hours.

Q. That means operator hours?

A. That is operator half hours.

Q. Yes; it says operator hours and the total day is 718 operator hours?

A. The total operator hours required at the switchboard is 718 hours.

Q. And the total required was 725—the total provided, instead of required, was 925?

A. To take care of the requirements at the switchboard, to take care of the necessary lunches and necessary reliefs.

Q. Now to get at that, the excess of 925 over 718, of 925 [fol. 9293] provided over 718 required, was 207?

A. Yes, that is correct.

Q. That is what you say was required for relief and lunch?

A. Yes, sir.

Q. The number required for relief and lunch was 93, and for relief during the relief period was 51½, was it?

A. Yes, sir.

Q. Now you only required 93 plus 51½ for relief during the relief and lunch period, that is 144½, isn't it?

A. That is correct.

Q. So that in this 207 available for relief and lunch there was 62½ hours that you did not need, wasn't there?

A. That is correct.

Q. Yes, and that should be added to your 62½ hours that you show as an excess?

A. No, that is the 62½ that we show.

Q. Well, is it?

A. Yes.

Q. Now 10:00 o'clock to 10:30, during those seven half-hour periods you show 103 operators provided and that is the highest number you provide any time during the day?

A. That is right.

Q. That means that the next lower number is 93 which runs from 1:30 to 4:00?

A. That is right.

Q. Now that means for three hours and a half, from 10:00 to 1:30, you employ those 10 operators, and that is the only employment they have during the day, does it?

A. No, all of the girls work a full day.

Q. How do you arrange that?

A. Just exactly as this exhibit shows, as we show at the [fol. 9294] side the number of girls and the exact hours that each girl works. As I stated, at the lefthand side of the exhibit where we show the figure 6, that means that there were six operators who started work at 7:00 o'clock and who finished work at 4:00 o'clock. Those girls were given their

lunch period from 10:30 to 11:30 and were given their reliefs as indicated on the line by the small figures near the middle of the forenoon and afternoon tour of duty.

Q. Now how do you indicate the lunch period there, Mr. Allen?

A. We indicate it by a slight bracket on either side of the figure indicating how many operators go to lunch. On that particular line the figure 6 is shown on the line from 10:30 to 11:30 with a little bracket around it showing that six girls had their lunch from 10:30 to 11:30.

Q. What does that upright line indicate, 4 on one side and 2 on the other?

A. That means that 4 of the girls had their 15 minute relief period between 8:30 and 8:45, 2 had it between 8:45 and 9:00.

Q. Now what are these lines as to which there is no number in the column under the head "trick?"

A. Those are possible tours of duty which we use where they are advantageous in drawing a schedule, but it did not prove advantageous in drawing a schedule for this particular office. This is a form which has been developed and found to be a considerable time saver on the part of people who draw schedules and all of the tours are drawn on to [fol. 9295] obviate the person who is drawing the schedule using a ruler and pen or pencil to draw in the tricks.

Q. So that if there is no number opposite the line there is no operators to correspond with that tour of duty?

A. That is correct.

Q. Then this sheet is a standard and it is just a question of selecting how many operators there shall be on each one of these standard tricks? That is the meaning and purpose of it?

A. That is covered in Traffic Circular No. 117 which has been supplied to the Associated Companies for assistance in this work, which is called the adjustment of force work.

Q. Now the number of operators required is something, I assume, that is developed from a study of the calling rate in the office?

A. No, it is developed by taking racoeds which we call peg counts of the amount of traffic occurring in that particular office during each period of the day, taken sometimes—taken always by hour periods and part in half hours; when there is a considerable variation certain counts are taken by half

hours so that we are able to develop the units up into either hourly or half hourly periods.

Q. Well, you get the number of calls from experience in that particular office and work out from that the number of operators to provide by dividing the number of calls during each hour by the number of calls that an operator can handle; is that correct?

A. It could be done that way; we have provided tables which saves this dividing and makes it possible for the person doing the work to do it much quicker than if they [fol. 9296] stopped to divide it.

Q. Then that means that the dividing has already been done and is set down in a schedule; is that correct?

A. That is correct.

Q. But that is the way it is gotten up?

A. Yes, sir.

Q. Now that is embodied in one of these circulars you have introduced in evidence?

A. I don't think I introduced it—yes, I think I did introduce 117.

Q. Yes, 117 was introduced.

A. It is in evidence. I don't know whether Mr. Anthony or I put it in.

Q. Well, you put it in. Now, taking this first line, which is used as indicating that 6 operators were on duty from 7:00 to 4:00, it shows that all 6 of them were off for lunch from 10:30 to 11:30; that is correct, isn't it?

A. Yes, that is correct.

Q. Now during that period 6 of the operators that are shown in this third line as being available for service were in their places?

A. That is practically correct, yes, sir. In reality it might be that 6 of the 13 operators who were available for lunch and relief were taking their lunch. We have to get lunches for all of the people that are there and during a part of the time the girls who are available for lunch and relief take their own lunch or relief or else give it to some one else.

Q. I do not exactly understand that?

A. We have 13 girls more than are needed at a certain hour. The obvious thing to do would be to let 6 of those [fol. 9297] girls, if we wanted to get some lunches out, the obvious thing would be to let 6 of those girls go to lunch. If you have 6 more than you need, you let them go to lunch.

Q. And put no one in their place?

A. And if you had 6 more than you needed at that hour.

Q. Well, now, this shows tricks varying all the way from eight hours—it is between seven and eight hours, isn't it? Some of them are seven and some of them are eight?

A. On this particular type operators who are required to work part of the tour in the evening are set up as working in the evening, where operators who work their entire tour of duty in the day time are shown as working eight hours. That is not a standard arrangement throughout the country. It is in general use in the larger cities where operators have to do a considerable amount of traveling, and particularly in cases where the operator works a tour of duty during the forenoon and another during the evening; the hours of work are somewhat short to partly offset the traveling time.

Q. That is, the girls who work part of the time in the evening only work seven hours for the same pay that the others who work during the day work eight hours for; is that correct?

A. Girls who work part of their time during the evening work a shorter tour of duty than the girls who work in the day.

Q. For the same rate of pay?

A. Not necessarily. They may get—in a good many places, in addition to that lower number of hours of work they may get some slight differential in money sometimes [fol. 9298] to offset the undesirability of evening work; so that they may get the same or may get more pay.

Q. That is, they are paid the same rate or more for the shorter period of time?

A. That is generally true.

Q. This shows 18 hours, doesn't it? That is correct, isn't it?

A. You are referring all the time to this same exhibit?

Q. Exhibit 12, yes.

A. I cannot understand that question. You will have to be more definite. Are you referring to some one line on that?

Q. No, I am referring to the exhibit as a whole. How many hours of operation does it cover?

A. All day; that is, the night hours are not shown in detail; from 11:00 o'clock until 6:00 in the morning, the hours are shown as covered by the space at the right; 11:00 P. M. to 6:00 A. M. is shown at the right.

Q. How is that force distributed during the night, according to this sheet?

A. There are 6 operators at work from 10:00 in the evening until 7:00 in the morning. They are shown on the very top line at the left.

Q. What are these other numbers at the right in that column, 3, 6 and 1, lower down?

A. Those are operators who work—opposite the 3—operators who work a morning trick and an evening trick. The same thing is true against the 6. The other 6 operators do work through the morning and come back and work during the evening, and the same way with the 1. Those are——

Q. Those are shown on both sides of the sheet?

[fol. 9299] A. The same as the night operators are shown on the same side of the sheet.

Q. They are not duplicates, however?

A. They are not duplicates. It is merely for convenience in carrying the eye across the form that those tricks which are not continuous are shown at both ends of the form.

Q. Do you know of the practice prevailing any place among the Associated Companies of hiring operators particularly for the peak load, residence peak load, in the evening; there is a residence peak load in the evening between 7:00 and 8:00, isn't there, as a rule?

A. In general the traffic in a residence office is higher between 7:00 and 8:00 than it is during a good many other hours during the day.

Q. Do you know of the practice prevailing in some places of hiring girls just for that peak in the evening and paying them practically as much, or as much as those who have an eight hour trick during the morning or afternoon?

A. No, I do not.

Q. That does not prevail any place in the Bell System?

A. No, sir.

Q. What is the function of supervisors of local exchanges?

A. They assist the operators in carrying out the handling of calls, take difficult calls off of their hands and handle them, and in general assist and train operators, particularly newer operators. They devote considerable time to showing them the correct methods of handling various kinds of calls and assist them in various ways.

[fol. 9300] Q. Do they check up on the service that is rendered by the ordinary operator?

A. Yes, they are continuously in touch with the service being rendered in their division to see whether any operator is either through carelessness or through lack of knowledge making any mistakes in her work and show her the right way to carry on the work.

Q. How do these supervisors plug in to keep track of what is going on?

A. We have on every operator's position a double jack which allows the supervisor to plug in and be right in on the operator's position so that she can hear exactly what is happening on that position, and supervisors in all cases wear head sets while carrying on their work, so that they can plug in and with a new operator they will plug in and oftentimes stay in on her position for a considerable period, even if they go down their section to help out and see what is going on in some other case; so that if this new operator should meet with any difficulty they will come right back and help her out so as to protect the subscriber from not getting proper attention on that position.

Q. A supervising operator is a regular feature of all local exchanges, is she?

A. Of all local exchanges of sufficient size to justify it. We would not have a supervisor in an office of three or four positions; but where we have say seven or more positions, there would be some one most of the time on the floor doing this supervisory work.

[fol. 9301] Q. Now that is a part of the system of operation that your department develops, this supervision, is it?

A. Yes, we work with the companies on the best methods of giving service and the use of supervisors to render that best service.

Q. Is this supervision practice covered in your Circular No. 117?

A. The number of supervisors that should be provided on a given number of positions is described in No. 117.

Q. Have you a standard number of supervisors to be used on a certain number of stations? Is that worked out?

A. No, it would not be on that basis. The number of supervisors is worked out entirely on the number of operators and the number of positions in the office.

Q. Well, that is what I had in mind. Perhaps I did not express it very clearly. That is, you have a standard of

so many supervisors to a certain number of operators, or one supervisor to a certain number of operators?

A. Varying with whether or not all of the positions on the board are covered. We have tables which, if you have the number of operators for each half hour, you read directly from this table the number of supervisors that we would recommend providing under those conditions.

Q. Then the number of supervisors would be in a definite ratio to the number of operators in service at a given time?

A. That is generally true, yes.

Q. In larger offices do you go a step further and supervise the supervisors?

A. Yes, we have in offices, after they reach a certain size, [fol. 9302] in fact in our offices generally we have some one who is either operator in charge or chief operator; and where the office is large enough so that it has floor supervisors, the floor supervisors would report to the chief operator of that office.

Q. Just what do you mean by a floor supervisor?

A. These girls you have just been talking about who actually work behind the operators.

Q. Then is there also a form of supervision that is carried out by what you call observers?

A. Well, I don't know as you would term that exactly supervision. We have observers. In all larger offices we have girls that we call observer instructors.

Q. Observer instructors?

A. Observer instructors who are provided to coach operators that are found to be deficient in any of the work that they are supposed to do, and coach them in their weak points and bring them along.

Q. That is part of the training system rather than part of the supervision?

A. Yes, I would not consider them supervisors. They are really of a training nature.

Q. That is, you are carrying your training on outside of the training proper, and watching the girls after they are trained to see how they put in effect what they have learned in training?

A. Yes, we have found that by combining some observing to find the points in which the girl is making mistakes and then showing her how she should have handled this particular connection has been one of the most profitable ways

of improving the work of the individual operators and we [fol. 9303] provide the necessary equipment and instructions for carrying on work of that kind.

Q. Now is there any difference between service when it is supervised and service when it is not supervised as to the speed with which calls are handled, for instance, the number of calls that are handled within a given time?

A. Yes, I should say that in the properly supervised office not only is more work accomplished by a given force, but better work is accomplished by that same force.

Q. By better work what do you mean? Quicker, more accurate, in making connections?

A. Quicker and more accurate work.

Q. There isn't anything else involved in it?

A. Well, all of the different things that go to make up the work. It would depend on just how you used that word "quicker and more accurate", as there are varying degrees of what you mean by accuracy. We have various technical terms, such as irregularities and errors—all of the different phases of operating are improved by the provision of well-trained supervisors.

Q. And there is a very considerable difference that is due to the supervision over an office that is not supervised?

A. Yes, I siad that the service is decidedly better in a well-supervised office.

Q. Now, Mr. Allen, on Page 432 of your testimony there is an answer that you gave that I wanted to inquire if it is written just exactly as you intended it should be. You were being asked to define what the terms traffic and traffic engi- [fol. 9304] neering mean as applied to the telephone business. And at the bottom of page 432 you say: "The traffic engineering work consists in the specifying of proper types and quantities and arrangements of telephone equipment, not only the switchboards on which the calls are actually handled by operators, but the connecting trunks, which term would apply to the wires between local offices and the toll circuits which are trunks connecting different cities or exchanges." Now did you intentionally leave out the connection between the switchboards and the subscribers stations in that statement? See if you have not left that out in the first place? As I read it you have.

A. I do not think that occurred to me. I do not know of anything that a traffic engineer has to do particularly with

providing lines of that nature. He would have the work of saying at what place on the switchboard the subscribers lines would be connected, but nothing to do with providing the lines that I know of.

Q. That was intentional then?

A. I was only giving a very general review of what a traffic engineer might do. I did not by any means expect that I covered all of the details of a traffic engineer's work in that one sentence or paragraph.

Q. I understand that. But you now say, as I understand it, since your attention is directly called to that particular thing, that the traffic engineer's duties do not cover the means of connecting the central office with the subscriber's station?

A. No, I have said that the traffic engineer would have [fol. 9305] the providing of the proper places where the subscribers' lines would be connected to the switchboard. I do not know of anything particularly that he does in connection with the line between the subscriber's station——

Q. Alright.

A. I might say that I am not an equipment engineer. I am only answering you in connection with equipment engineering to the best of my knowledge as a telephone traffic man. I am not a specialist on that work.

Q. In your investigations concerning traffic you do cover or have a good bit to do with types of equipment to be used in various cases, do you not?

A. Yes, I have had a great deal to do with types of switchboards and operating methods. I haven't anything to do with the details of traffic engineering that would cover exactly the point you are raising now.

Q. What is your exact position?

A. I am traffic results engineer.

Q. Traffic results engineer?

A. Yes, sir.

Q. Just exactly what are your duties personally?

A. I described in my direct testimony my duties in considerable detail. They consist in the provision of such circulars as those covering peg counts, those covering adjustment of force, covering local and toll central office management routines and work of that kind. I also in that testimony described the fact that we have on our Staff a local traffic engineer, a toll traffic engineer and a toll special

problems engineer. I am only in general familiar with [fol. 9306] actual switchboard engineering.

Q. It is a particular function to work out such details, such methods, as are involved in this Allen Exhibit 12?

A. Yes, that is covered in traffic circular 117, one of the circulars that is issued by my department.

Q. It is the method of handling the traffic by the people in the exchanges that you have particularly to do with, is that it? Is that correct?

A. That is correct.

Q. In the traffic department there are three other divisions with which you have nothing to do excepting in an incidental way, as your work may come in accidental contact with it, is that it?

A. We work closely together of course.

Q. You work together?

A. We do the work.

Q. Your men are responsible for their particular parts of the job, however, when it is completed?

A. That is correct.

Q. Now you described these four different divisions. What is this fourth branch of the traffic engineering, devoting its attention to special traffic matters? What do you include in that?

A. There are a great many special problems come up that must be assigned to some one, and for convenience in organization, at the discretion of the head of the department, he assigns certain of those to this special traffic problems engineer. In addition to that, as I have stated, he carries the total fundamental plan routines and the toll rate quoting routines.

Q. Would that branch have to do with things that might [fol. 9307] be ordinarily handled by any of the other branches, but which, because of their special nature, required some special treatment?

A. No, in general they would be some special problem that did not fall under the other headings.

Q. Now the department, this first department, which is the traffic engineering department, local traffic engineering department, you say is responsible for the specifying of the types and quantities and arrangement of the equipment which will best meet the problems confronted in giving local exchange service. Now that hasn't anything to do, how-

ever, with the development of central office equipment, has it? That is entirely outside of the traffic board, isn't it?

A. No, the local and toll traffic engineers are busily engaged in problems of the development of both operating methods and types of equipment.

Q. Is that the department which considers and plans and develops new mechanical devices to put on the central office equipment?

A. Well, they do the traffic work in connection with those developments.

Q. I am asking you about the mechanical work, the electrical work?

A. No.

Q. Invention?

A. That is done in our department of development and research, as Mr. Rhodes testified.

Q. Now which department was it that experimented over the considerable period and developed a type of tinsel used in the cords which was strong enough to serve the purpose required by the cord? What department developed that?

A. That was done by the development and research,—plant engineers.

[fol. 9308] Q. Not by the traffic department?

A. This work is done in cooperation, various parts of nearly all of the development work, where the traffic requirements are outlined by the traffic department. You cannot expect a man to be an expert on all lines.

Q. That is true.

A. He does the work that he knows, or outlines the conditions which he knows will be beneficial, and then some one who is an expert in the electrical or mechanical or technical field does the best he can to meet those requirements. Then that material is taken, for instance, by the traffic people and given a thorough test to see whether it meets the requirements which they have in mind, and additional suggestions made, until a satisfactory method or piece of equipment is developed. And then it is recommended for the companies.

Q. Now you stated that by the development of this improved type of cord a saving of $7,000,000.00 per year in the expense of operators wages had been effected to the advantage of the Associated Companies. Tell us just how that saving was effected?

A. By the use of this cord the time which the operator spends in handling cords, actually putting up and taking down connections on the switchboard, was reduced by a half second per handling time on one cord on a connection——

Q. On one what?

A. One cord.

Q. One cord?

A. The operator on a local connection has to handle two cords, one on which she answers the calling party, the second on which she makes the connection with the called number [fol. 9309] or to a trunk leading to the called office, so that on the connection of that nature there was a saving of one second per call. That makes it possible for the operators to handle a larger number of calls in an hour, and correspondingly reduces the number of operators required to handle the number of calls originating in the office.

Q. Whereas I think, as you said, before this improvement was put in it took 11 seconds to complete the call, afterwards it took 10?

A. That is correct, applying to a call into the local multiple on a standard No. 1 board.

Q. What is the effect as applied to any other kind of a call—a trunked call?

A. A trunked call, a saving of one second at least, but the trunked call takes about 15 seconds of work, so that the per centage of saving would be——

Q. Not quite so large?

A. Reduced by that amount.

Q. Tell us how the difference in this material made it possible to save that time?

A. The operator in getting this stiffer cord from its cord seat and getting it bent and put into the multiple jack took this time, and by providing a cord which could be more easily handled the operator was enabled to do the same work in one second less time. In order to give you a little better idea of the importance of those things, we found at a later date—some of the plant men found by putting a fairly heavy coat of wax on the outside of the cord it helped them in [fol. 9310] maintaining the cord. But just that added stiffness of the cord that came from putting the wax on it made it noticeably more difficult for the operator to manipulate these cords and we had to send out instructions that the small saving of maintenance due to waxing these cords was

much more than offset by the reduction in the work that the operator could accomplish.

Q. Now this is the same thing as to which Mr. Rhodes testified to a saving in cost based upon the fact that it would last longer, as I understand?

A. Yes; fortunately in this case the cord not only was better from an operating point of view but better from a maintenance point of view.

Q. But what you are talking about here, this $7,000,000.00, is entirely based on the shorter time in which the operator could make connections; is that correct?

A. Yes, sir.

Q. Now what is your arithmetic on that $7,000,000.00?

A. I applied the saving on local and trunked calls and weighted those together for the system; about 60 per cent of the calls are trunked, so that on the basis of 40 per cent of the calls being local and 60 per cent of the calls being trunked, we found that there is a saving of 7½ per cent on the average, and we have in our records the payroll of the local operating forces in offices where these calls are handled amounting to $105,000,000.00 per year. I applied the 7½ per cent to the 105 millions of dollars and that gives [fol. 9311] $7,875,000.00 a year that is saved by these cords.

Q. Seven million what?

A. $7,875,000.00, and I gave you the figure of seven million as the round number on that.

Q. Now you use 105 as your operators wages; you have used 140 in a number of places; what is the difference in those figures?

A. I excluded the wages of toll operators inasmuch as the toll operating time is so long that the saving on one second per cord handling time would only be a rather small element.

Q. This is the local exchange operators payroll then? What year is that?

A. That is for the year 1923.

Q. Have you any record that shows an actual increase in calls completed because of that change?

A. Yes, we have from time to time revised the loads which we ask our force to carry, and the loads at the present time, due to various improvements, is considerably higher than it was a number of years ago, as we are constantly making studies of the possible loads, and from time to time the loads

which we specify as the proper loads are revised to take care of conditions of this kind.

Q. Is it possible in any of the financial records of any of these companies to show a saving in the payroll on account of this particular change, a smaller number of operators handling a given number of calls or doing the work of the local offices or anything of that kind?

A. The records would not be kept in any way to show or to isolate anything of that kind. We have from time to time in-
[fol. 9312] vestigated and as a matter of fact the operator loads taking care of the changed conditions are higher now than they have been in the past.

Q. When was this particular change put into effect? I am talking about this tinsel cord now?

A. The first cords were standardized in the general engineering circular that was sent out in 1912 and certain improvements have been made from time to time since that time in these cords.

Q. Now before that they used this steel cord, didn't they?

A. Before that they had used a steel cord, not all of the time; they had attempted to use a tinsel cord but it was found it could not be maintained and they would have to go back to steel cords, and the tinsel cord that was found to be advantageous from a maintenance and operating point of view was the one that was standardized in 1912.

Q. That was an improvement over the old idea that had been used for awhile and then abandoned for this steel cord and then they came back to the tinsel in some improved form; is that correct?

A. Yes, sir.

Q. And the steel cord was experimentally introduced and was found to be unsatisfactory after several years of use?

A. It was found *ot* be unsatisfactory from the operating point of view, and the tinsel cord which was superior both from operating and maintenance standpoint was continued and substituted for it.

Q. Now you have records of the loading—is that the term
[fol. 9313] you use—for different periods, have you?

A. No, we do not have records of that kind because we reduce the calls to units and by revision of the coefficients we take care of various changes in the art; so that we do not have records showing the number of calls per operator during various periods.

Q. Then there isn't any record in existence by which you

can show that this seven million dollar saving was ever realized, is there?

A. Yes, we have the present loads which are based on the work time comprehended by the present tinsel cord. As I stated, the work time was one second longer when we had the steel cord.

Q. Now the present load is what?

A. 230 units.

Q. What was the load in 1911?

A. I just stated that that is taken care of—we are keeping 230 units as the constant load and changing various coefficients as we find that conditions change in the method of handling calls. If we get a method which reduces the amount of time required to handle the call, or a piece of equipment which reduces the amount of time required to handle the call, we make some revision in our coefficients which takes care of those different elements. Now we do not do that each time that some one thing is done in the art. We do it periodically, because there are, in order to improve service, methods put in which may result in lengthening the work time on the part of the operators. There are at other times equipment or methods put in which shorten the work time. So that it is impossible to isolate any one element and [fol. 9314] by the records show during a period of years the effect of that one change.

Q. Well, you have undertaken to say that you have saved this company, or these Associated Companies, $7,000,000.00 by a particular change, and I want you to either tell me that you haven't any record which substantiates that claim or show me what that record is.

A. I testified to that——

Q. You have testified, but I want to know if you have a record which backs up your testimony?

A. I have the facts which back up my testimony that the work time on the steel cord was one second longer than it is with the tinsel cord.

Q. Now how did you determine that?

A. By actual stop-watch observations.

Q. Over a great many different operations?

A. Over a great many different observations, and on the part of the work of a great many different operators in a number of different offices.

Q. Now, as to that, you did not have anything to consider expect the difference in the cords, did you? Any kind of an

operator could make better time with the new cords; that is correct, is it?

A. That is true, yes, sir.

Q. But every operator would not save exactly this one second, I suppose, on every call?

A. No, with any of these we would arrive at an average figure on the part of a number of operators.

Q. And because it takes only ten seconds to make a con- [fol. 9315] nection which, before the adoption of this particular piece of apparatus, took 11 seconds, that is the basis on which you figure this $7,000,000.00?

A. Yes, sir.

Q. You are not prepared to say that there was ever realized any actual work done or money saved by these companies?

A. I have stated it was saved.

Q. I have asked you to show us a record which will establish that fact; we haven't anything but your word for it, Mr. Allen, and I do not believe you know enough about the A. T. & T. organization or system to say of your own knowledge. Now I want to know where you got it?

A. We have from time to time equated for the various changes——

Q. Now you say you have done; let us see the record of what you have done. You must have a record some place; where is it?

A. Our records on things of that kind are not kept isolated in any way so that it would show on the records.

Q. Now let us get away from this and let us have you tell us or show us what record you have of an improvement in efficiency in the calling rate or the load, as you call it, or whatever it is, which will be explained by this improvement and any others that you may see fit to add to it in order to make a showing. How did you get this 230 that you have now? What does that mean, this 230 loading that you talk about?

A. That is the number of units which we have found that the average experienced operator can handle——

Q. What is the unit that you talk about?

A. It is an arbitrary unit established for the handling of [fol. 9316] the telephone business.

Q. Is it a call?

A. It is a unit. No, it is not a call.

Q. What does it mean? What do you mean by unit? A unit

can mean so many things. The unit with which you deal is a call, isn't it?

A. It is not necessarily, no.

Q. What is it then?

A. A unit is the 1/230 of the amount of work which the operator can do in an hour.

Q. Isn't that measured in calls?

A. No. We happen to have one type of board where the calls—part of the calls on that board happen to be the same as a unit at the present time, although any change in the art might result in the fact that we would not have any type of calls which would be exactly a unit. A unit, as I say, is 1/230 of the work that the average experienced operator can do in an hour.

Q. Isn't there at the basis of that the number of calls that the operator can actually put through in an hour?

A. We have many different kinds of calls and the very idea of the unit is to get the thing on a common basis so that we can have some common term. If we held it in terms of calls it would be defeating the very purpose of the unit, which is to reduce the kinds of calls to one common term.

Q. Let me ask you to do this; let me ask you to explain on this record the method by which you determine that the amount of business that can be handled by the various operators has been increased to any definite degree between [fol. 9317] 1910 and 1923. Do that in any way that you can without talking about any coefficients. I don't understand those.

A. Well, the actual number of calls on the average board when we take care of——

Q. What do you mean by the average board?

A. Well we have different kinds of switchboards. We have switchboard positions where we handle pay-station calls; we have switchboard positions where we handle flat rate calls; we have switchboard positions where we handle message rate, message rate registered or message rate ticket calls, so that taking any one of those boards, or taking the board as an average, the number of calls per hour that the average operator is handling at the present time is more than it was in 1910.

Q. Now is that your answer to my question?

A. Yes.

Q. How much was it in 1910?

A. I haven't the definite figure with me on that.

Q. Have you them any place?

A. I have from time to time in the past had figures of that kind but I haven't any figures now. I don't know whether we could secure figures as far back as 1910 or not.

Q. That is the year, as I understand it—the reason I asked about 1910—or let's say 1911—you have said that in 1912 the change in the switchboard cords was effected?

A. No, it was started then.

Q. There has been a gradual improvement since that time?

A. Yes, sir.

Q. You commenced to effect and realize this saving, didn't [fol. 9318] you, at this time? Now you mean to say that there has been a saving of $7,000,000.00 in operators wages over this system as a whole in the year 1923? That is what we are to understand by what you say on this point; is that correct?

A. Yes, sir.

Q. Do you mean to say that the operators payrolls are $7,000,000.00 less than they would have been if it had not been for that improvement?

A. I said that, yes, sir.

Q. You do not claim that that is a saving effected by the traffic department, do you?

A. Yes, sir, I give it as a saving effected by the General Staff.

Q. I understood that you were talking about the savings effected by the traffic department? I was mistaken in that?

A. No, I do not think you are mistaken. I explained at the time you asked me that that this cord was developed in cooperation between the traffic men who set up the requirements and the technical men who carried them out, and the result of that was the improved cord which effected these savings in payroll.

Q. Let me ask you this, do you mean to say, as a matter of fact, upon your personal knowledge, that the Associated Companies are employing fewer operators than they would have employed except for this cord, to the extent of $7,000,000.00 per year?

A. Yes, sir.

Q. How much does an operator get in wages? The price varies, does it not?

A. Yes, sir.

Q. Did you make any study of payrolls of the different parts of the country?

A. Not so that I would have any definite figures in my [fol. 9319] head as to what operators get in different parts of the country. I have data on that which we use, but nothing that I could carry in my head.

Q. Do they get as much as a thousand dollars a year?

A. In some cases.

Q. Down as low as how much where they are employed eight hours a day, as you say they are according to these standard time sheets?

A. Oh, I suppose 600.

Q. 600 to a thousand is about the range of their salaries, is it?

A. There are cases where it would be more than a thousand; the range might be 600 to 1200.

Q. That means then that there are 8000 less operators in service on the Bell System in 1923 than there would have been if it had not been for this change in cords; is that correct?

A. That would be approximately correct.

Q. Now of course you have no record upon which you can base that statement? You simply say that because you know by investigation that they are making their calls in 10 seconds instead of 11, as they used to do?

A. And I know that they are handling more calls on the average per hour now than they were in the period preceding the use of these cords.

Q. But you are still not able to tell us how many calls per hour they were handling before they commenced the use of these cords?

A. I haven't any data on that now.

Q. We will have to take your word for it. Al-right. Now [fol. 9320] you testified also to a saving of 3½ million dollars on the ringing, the machine ringing on the B board, didn't you?

A. Yes, sir.

Q. Now, how is that saving effected?

A. In the office where we have machine ringing on B boards there are 18,260,000 calls handled per day; and the coefficient which applies to boards where the calls are handled and rung with manual ringing is .742; on calls where the calls are handled by machine the coefficient is .591; the saving per call is therefore .15. So that on these

over 18 million calls we save .15 units of work per call; that amounts to a saving in units per day of 2,700,000. And applying to that the cost per thousand units of $3.92, which was the average cost in offices having machine ringing for the period from February, 1923, to January, 1924, we get a saving per day of $10,737.00, and reducing that to a yearly basis, the factor which we found reduces daily traffic to a yearly basis, allowing for a smaller amount of traffic on Sundays, is 330, so that applying this would reduce the savings to a yearly basis and give the figure of $3,543,000.00 as the saving per year due to the machine ringing on the B boards as opposed to manual ringing B boards.

Q. Why did you take February, 1923, as your starting point?

A. I took the period of one year previous to the time that I made up these figures as being representative figures. And at that time, January, 1924, was the only money that was available in 1924, so I went back to get a 12 months period as being a representative period. It is not affected very [fol. 9321] materially if I take all of the year 1923.

Q. Now when was this machine ringing on the B boards put into effect?

A. It has been put on at various times, starting in April, 1911, and has been gradually extended through the System until at the present time, when it is in rather general use on B boards.

Q. It has been installed on different boards as occasion for rehabilitation came up or putting in new boards, has it?

A. Or when work was being done in the office so that it was economical to do the job.

Q. There hasn't been any general making over to put this in effect, but when it was convenient to do it it has been done, is that correct?

A. In some cases on large B boards it was economical to do it as a job by itself. It was worked out in the most economical way as to time of accomplishment.

Q. Just exactly what difference does this improvement make in the operation, in the process of putting through a call?

A. It saves the operator the actual work of ringing at the time that the call has been put up, and then devoting enough of her time to watch the signals and to give repeated rings on such calls as are slow in answering. It not only saves

her the actual work of ringing, but the attention which she has to give to the key shelf in order to give the necessary supplemental ringing.

Q. That is, she makes the connection and drops the matter and goes to something else immediately? That is, she does [fol. 9322] not have to make the extra movement necessary to ring the bell at the called person's station?

A. Both on the original and such supplementary ringing as might be necessary, yes.

Q. Has that principle also been applied to A boards?

A. Under such conditions as it proved in we have extended it to A boards; of course you can see on the B board, where the load would possibly average something over 400 calls, that the amount of saving would be very much larger than it would be on an A board, where the number of calls would be possibly about half that; so that it would be much more difficult to prove in ringing on A boards than it would be on B boards.

Q. Is there a difference in the calling rate on A boards and B boards?

A. We do not have anything we call a calling rate on B boards. There is a decided difference in the number of calls that an A operator can handle and a B operator can handle. I should say, roughly, it would be two to one; that is, the B operator can handle twice as many calls as the A operator; she does not have to deal with subscribers or repeat back and has to only handle one cord as opposed to two cords the A operator has to handle.

Q. Of course this machine ringing calls for additional equipment, something to be added to the B board, doesn't it?

A. Yes.

Q. Have you measured that against your 3½ million saving?

A. Yes, I did. I have given you the saving in the operators wages and I have not put in any saving for the B [fol. 9323] positions which are saved at the same time with several operators. The saving in B positions practically offsets the more expensive machine ringing trunk, so that the figure I have given you is the net figure, which would be a complete saving to the companies.

Q. That is you say that there would be a proportionate saving in the number of operators and positions needed and therefore that much less equipment would be required and

the amount of equipment you would save would equal in cost the cost of the machine ringing trunks that you would have to put in; is that right?

A. Yes, there would be the saving in switchboard positions and in subscriber's multiple. In fact, I think it is considerably more than offset—considerably more than offsets the added cost of the machine ringing trunks.

Q. Have you any figures on that?

A. Yes, I have had figures on that on which I based that conclusion.

Q. What were those figures?

A. I haven't those figures with me.

Q. How would you figure that out applying it to the whole System? You would have to have some basis of switchboard positions to offset against this other expense, wouldn't you?

A. Well, we have figured from time to time the number of switchboard positions that would be saved by the introduction of machine ringing trunks, so that it would be necessary to figure anything of that kind for every office in the System in order to know in general——

Q. Well, now, have you in mind any central office where [fol. 9324] you have put in machine ringing for the B board where you have done away with any positions?

A. We would either reduce the number of positions or would have additional positions for growth.

Q. Now get my question. Have you in mind any situation or any central office where you have reduced the number of stations because of putting in machine ringing on the B board—the number of positions, I should say?

A. Yes, we reduced the number of positions occupied in the busy hour in every board where we put in the machine ringing trunks.

Q. Just name us one board where that is done and where you have actually put any equipment out of position because you have done away with those stations or positions?

A. In the majority of cases it would be providing equipment——

Q. Just say yes or no. Can you name such a place, any place where you have put any switchboard equipment out of use because of this improvement?

A. I am not familiar with that.

Q. You don't know of any such place, do you?

A. No; I know that there are such places but I haven't any particular places in mind.

Q. How do you know that there are now, if you haven't any particular places in mind?

A. Because I know that the introduction of machine ringing reduces the number of positions required.

Q. It reduces the requirements, but do you know of any [fol. 9325] cases where it has reduced the number of positions and the amount of equipment provided for those positions set?

A. No, I haven't.

Q. You haven't any such knowledge?

A. No, not by name.

Q. Will you tell us any way in which this saving you have been talking about because of this machine ringing has actually been realized as shown by any record of your company or these Associated Companies?

A. Yes; I have given you the standard coefficient from the actual circulars which I put in as an exhibit here; given the coefficient applying to a board with manual ringing and given the coefficient applying to a board with the machine ringing, and the difference between those coefficients on the average would vary for different studies, but it would be on the average this .15, and the actual operators provided at the switchboard are provided on the basis of the units either with or without machine ringing, so that there is no question at all about the saving being accomplished.

Q. And you say that the net gain of the Associated Companies in the aggregate is 3½ million dollars per year because of this?

A. Yes.

Q. You have not determined that by comparing payrolls, one year with another? You have determined that entirely, so far as you are concerned, by determining the result of your time studies on the making of calls so as to establish these coefficients that you have used and applying them to the total amount of business done in a certain period; is [fol. 9326] that correct?

A. That is not correct.

Q. Then what is the fact? What have you done besides that?

A. I don't know whether I can make it any clearer now or not. I have stated that we have definite coefficients for the

manual board which are a matter of record in the exhibits which have been entered in this case, and another set-up applying to the machine ringing boards, and that the difference between those two amounts is .15 units per call; and that those are the coefficients—nothing theoretical, nothing at all; they are actually in use by all of the Associated Companies in laying out their B boards.

Q. Do you know of your own knowledge or from any record, that these Associated Companies actually employed fewer switchboard operators because of this change than they did before the change was made?

A. Yes.

Q. You actually know that?

A. Yes, sir.

Q. From what source do you get that information?

A. We have standard reports which show the load or number of units.

Q. I am not talking about loads or units. I am talking about operators. Have you any record or have you ever seen a statement which would show you were employing fewer operators because of any of these changes you are talking about?

A. Yes, our standard reports, a copy of which is in the circulars which I introduced as an exhibit, would do that.

Q. Will you show me which of these exhibits shows that? [fol. 9327] I think those are all of your exhibits. I am not familiar enough with them to say definitely.

A. Exhibit No. 7, Form No. E-43, shows against Item 22 the current peg count load on B boards. This is a standard report, and from looking at this report we have the definite loads that are carried, and whether that load remains practically the same on boards having machine ringing and manual ringing would show whether the saving is actually being made as called for by the coefficients, and the reports for the offices in which the machine ringing has been installed do show that this saving is actually being made.

Q. Now where is the record among those exhibits which you have introduced which shows the number of operators to be less than it was before this was installed?

A. Mr. McConnaughey, the record would not—these records that we have are kept entirely with the idea of handling our business in the most economical manner. It would not be kept to show this particular point in the exact manner that you are asking for.

Q. Why didn't you say that and save us all this time? You promised to give me——

A. I just outlined the way that the saving which I put in here is definitely shown,——

Q. I asked you if you had——

Mr. Burr: Oh, let him finish, if you please.

The Witness: In my testimony, and I at no time said that a certain number of operators had been saved by this means.

Q. Oh, yes, you did.

A. If our records had been kept in a way that would show [fol. 9328] the exact number of operators I would be glad to quote it in that way, but I have given this information——

Q. Well, what is it?

Mr. Burr: Let him finish.

Mr. McConnaughey: He never does finish. That is the trouble.

The Witness: I have given this information from the records as they are available.

Q. Yes, I understand you. I asked you to show me on the record where the number of operators was less and you did not do that. That is what I am complaining about. If you cannot, just say so and save a lot of time and record and a lot of disappointment for me. Mr. Allen, you total the savings in connection with switchboard development at 16 million. That is on page 468. Just exactly what do you cover by that? You include this tinsel cord and the machine ringing and the prepay coin boxes?

A. Yes, sir.

Q. Now, something besides that?

A. Yes, I have included overlap ringing, improved toll operating method generally known as overlap ringing, which amounted to $2,600,000.00. I included the introduction of the audible ringing set which amounted to $1,500,000.00.

Q. That makes the additional $4,000,000, does it? Is that correct, that makes the additional four million?

A. Yes, sir.

Q. Now you have figured the savings on these other things in the same way that you have what you have already testi-

[fol. 9329] fied to; that is, by this—well, no, this pre-pay coin box would not work the same way.

A. The pre-pay coin box is a matter that would be worked out in practically the same method as the savings through machine ringing trunks; that is, we have definite coefficients applying to the post-pay and definite coefficients applying to the pre-pay to get the saving per call due to the change, and by applying that to the number of calls get the units saved. The same is true of the audible ringing, which is the result of studies which were made at the time we were studying that subject, in which we found the percentage saving in A operators work time which could be brought out by the introduction of that method.

Q. Well, give us the detail on the audible ringing; first, will you tell us just what that audible ringing is? I have forgotten.

A. The audible ringing signal is a method whereby we arrange to have a tone which is given to the calling subscriber that lets him know that the called station is being rung. By the introduction of that we abolished the previous practice of the operator at stated intervals going back in on the line and giving what we term voluntary supervision. The phrase she used I think was "I am ringing the party". If the operator does not have to watch the call after she has them put up and give these reports at stated intervals she can use that time to handle other calls, and by that means we were able to increase the loads and save in the number of operators required.

Q. Does that apply to both A and B boards?

[fol. 9330] A. No, we have applied it entirely to the A boards.

Q. To the A boards?

A. That is, it is given on calls completed to the B boards, but the B operator does not listen in on connections or give any reports to subscribers so that the introduction of the audible signal had no effect on the B operator.

Q. Do calls terminated on both A and B boards give this audible signal to the subscriber?

A. It depends entirely on the plant. In some cities we do give them on calls to both the A and the B board, and in other cities where there are a very small number of calls completed on the A board, it has not been found necessary, both due to the fact that there is a very small number of

calls and due to the fact that the answering time is shorter on those calls. So that it is a matter of study in each city to determine whether we put it in on the A calls and the trunked calls or not.

Q. It is a matter of economy to the company whether you put it in or not?

A. Yes, it is a matter of study to see whether it proves in.

Q. Proves in?

A. Yes.

Q. Go on and state how you arrived at this figure?

A. From the records which we have of cities where this audible ringing signal is in use we find that there are 59,900,000 units handled on A boards on calls with the audible ringing signal. As a result of our studies at the time this signal was introduced we found——

Q. When was that, by the way?

[fol. 9331] A. The study was made in a number of cities from 1910 to 1916. In 1910 this use of the audible ringing signal was standardized for what we term our No. 1 C switchboard, and as a result of further study in 1916 it was standardized for use in multi-office cities, and as I was stating, as a result of those studies we found that there was a saving of three per cent due to the introduction of this signal. This results in a reduction of 8800 operator hours per day on the A boards having this audible ringing signal, and at the average cost per employ hour of 52.6 cents, it results in a saving of $1,527,000.00 per year.

Q. Now, in these cities that had the 59,950,000 calls, were those just the calls that were completed on the A board?

A. Those are units on which the audible ringing signal was used—no, a great many of those calls—a majority of them go to a B board for completion, because on those calls, as I stated, the audible ringing signal is given but the saving is entirely to the A operator, as we do not ask the B operator to give any voluntary supervision. The saving is all in A operators.

Q. You have not discriminated between the A and B calls in that number of 59,950,000; you have taken all of the calls in the exchange?

A. No, we have only taken the calls on which the audible ringing system applied because at certain offices, as I stated before, we do not have the audible ringing system on the

calls that are completed on the A board, and in those offices only the trunked calls or units resulting from trunked calls are used in our computation.

[fol. 9332] Q. You have made that separation, have you?

A. Yes, sir.

Q. Well, now, this method of figuring assumes that every operator is working to capacity, does it not?

A. Well, it assumes that the operators are working to the same capacity before and after the introduction of these savings; that is, we are doing the best we can with one method and when we get an improved method we do the best we can there, and find that we are able to do a certain percentage better.

Q. I understand that this method of reducing to a common loading figure accomplishes that end; that is, it assumes before and after that every operator was working to full capacity, doesn't it?

A. I don't know just exactly what you mean by full capacity.

Q. Doing all she can do; she is doing a reasonable hour's work each hour?

A. I do not know that I would want to say——

Q. How do you make sure?

A. No, I say I would not want to be misunderstood, that we were making the operator do all she can. We are having her do a reasonable hour's work.

Q. Now let us see how you get at the saving; what was the other 2½ million saving?

A. Overlap ringing.

Q. Yes, the overlap ringing?

A. As a result of our——

Q. That is on the toll boards only?

A. Yes, as a result of studies which have been made on [fol. 9333] that method of handling toll calls we have found that a saving of 10 per cent in the work of the operator results from the introduction of this method, and that applies to $26,250,000.00 per year, which is the wages of the toll operators on the out toll boards, to which this new method applies, and by applying the 10 per cent to that we get a saving of $2,600,000.00 per year, due to the introduction of the improved method.

Q. Now, did you describe that improved method? I do not recall that you did, in your direct testimony?

A. No, I did not.

Q. Just what do you mean by that, in a few words, so that we can identify it?

A. That is a method whereby the operating is changed so that the operator rings at the terminating end, announces "ringing", when she rings the called person. The operator at the originating end then calls the calling party and by timing those rings properly we get the calling and called parties at the telephone with less wait at either end, which saves the time of the subscribers and also saves the time of the operators.

Now there is a considerable additional saving in the toll plant and I had not introduced any figure as to just what that is, but there would be, in addition to the saving in operators time, a considerable saving by the release of the toll plant, which could be used for additional business.

Q. Now that is entirely a matter of method and calls for no new apparatus?

A. It is entirely a matter of method.

Q. Now these things that you have detailed are items as [fol. 9334] to which your department has determined in the study of results, which is one of your functions, that these savings have been effected; that is true, is it?

A. That is true. There are many other savings, but these are typical ones that lend themselves more readily to valuation due to the fact that we have made definite studies at the time they were put in and know exactly what the per cent saving is resulting from that.

Q. Well, now, there are a great many other items you have referred to now and generally which you say are the basis of claims of savings that have been effected in the operation of the traffic department; that is correct, is it not?

A. Yes, these have resulted in savings in the expense of operation throughout the Associated Companies.

Q. You stated, I think, in your direct testimony, that this traffic department of the General Staff was organized in its present form about 1909; is that correct?

A. No.

Q. Was there a statement of that kind made?

A. I do not remember making any statements in regard to the time this department was organized. I think I stated that I entered the department about August, 1910.

Q. That is not important, but I thought you had made some such statement as that?

A. No, sir.

Q. Now, in the year 1923 I think you state in one of your calculations there that the average hourly rate for operators was 52.6 cents; is that correct?

A. The average pay, weighted for the necessary supervisory time and rest and lunch room time. I figured the witchboard operators hours saved and, as you brought out [fol. 9335] earlier this afternoon, there are floor supervisors, which vary directly with the operators. Instead of calculating how many of their hours are saved, I weighted the added cost of those supervisors into the cost per hour and then we had such a figure available the cost per hour weighted for supervisory time, so that to simplify the operation I used that. I figured the average cost per employee hour for the system without being weighted for supervisory time or rest and lunch time was about 43 cents for the year 1923.

Q. That 43 cents is the actual hour rate upon which the pay check is figured, is that correct?

A. But in saving operators you save supervisors, and for convenience in figuring I weighted that into that figure.

Q. Is that 43 cents per hour the rate for operators in the year 1923? Is that the year you are speaking of?

A. Yes.

Q. What was the company paying or what was being paid to operators in the year 1910?

A. Cost per employe hour I don't know as I can give it to you for 1910. I have the cost in amount of about 1912 or '13. Pre-war costs were about 19 cents.

Q. And the increase between 1912 and '13 is the difference between 19 and 43; that is correct is it?

A. That is correct.

Q. Have the savings that have been effected by any of the improvements that you know of that have been made by the General Staff in the way of operators time kept pace [fol. 9336] with the increase in the wage scales?

A. I don't think I understand that question.

(Question read.)

Q. Do you understand that?

A. No, I can't say that I do.

Q. Have they been sufficient to overcome the increase in the rate of wages?

A. No, the cost per thousand units has gone up. It is higher now that it was in pre-war times.

Q. Have you any figures on that; cost per thousand units, is that the way you measure it?

A. I haven't any definite figure on that.

Q. Have you made any studies of the cost of operating in the traffic department based on the difference in the wage scales?

A. Yes; if we reduce the cost per thousand units at the present time, that is during 1923 and 1924, to the wage levels as they existed in 1912 and '13 the cost per thousand units is lower now than it was at that time.

Q. How much lower?

A. Well, it varies; I would say in the neighborhood of 15 per cent lower; I am saying adjusting to the 19 cent wage—if we had that now we would be operating about 15 per cent more efficiently than we were in 1913.

Q. Is that answer confined strictly to the operating expense, the traffic operating expense, I mean?

A. Yes, that is all I am referring to.

Q. That is all you are referring to?

[fol. 9337] A. Yes, that is all the figures that I am familiar with as definitely as I should be to answer that question.

Q. What is the cost per thousand units at the present time?

A. It is running about $4.00.

Q. What does a thousand units represent? Is that the same unit you were talking about awhile ago?

A. Yes, sir.

Q. 230 per hour?

A. Always when I refer to units I am talking about the same unit.

Q. That is the purpose of it, so that you can always be talking about the same thing, isn't it?

A. Yes.

Q. $4.00 per thousand, is that correct?

A. That is approximate; I haven't the exact figure with me.

Q. Can you get us the exact figure?

A. Well, I haven't any such figure with me.

Q. The question is, can you get it for us and supply it?

Mr. Burr: Do you want that for the system as a whole or for Ohio?

Mr. McConnaughey: I am interested in Ohio.

Mr. Burr: We can, and will be glad to give it to you for Ohio if you wont bother Mr. Allen to come back with it.

Mr. McConnaughey: Will you carry it back to 1912?

Mr. Burr: We cannot tell you as we sit here how far back our records go.

[fol. 9338] Q. You have this as a amtter of record, haven't you, in your files?

A. It all depends on what—

Q. You have used 43 cents and 19 cents in comparison; now you must have a record of that some place; that covers the system, as I understand it, and I would like to have that, as well as the figures for Ohio, if you can. Can't you get that and send it in?

A. I will ask the people in New York whether they want to give that to you or not. That is more or less of a confidential figure that we would not care particularly to have given out in general unless it has some very necessary use.

Q. I do not understand you when you say that anything about that company is a confidential figure that has to do with its operating results, and I wont accept that as an answer to my request. I am going to ask the Commission to ask you to produce your records upon that proposition.

A. I will try to get that figure if I can get it for you in New York. It will result in some work going over records and averaging them up.

Q. I assumed that you had it because you used it very readily a moment ago. You compared your 43 cents with your 19 without any particular calculation and I assumed that you had it in your files.

A. I qualified that as approximate. There would probably be fractions or variations. I was giving you the very best I had.

Q. Now you do the best you can with that and send it on, wont you?

(No reply.)

Mr. Burr: I think Mr. Allen's statement that the figures [fol. 9339] are more or less of a confidential nature is a good reason and ought not to be misunderstood. If I correctly understand the situation, the computation which the gentlemen on the other side are asking for would require the pro-

duction of wage rates and levels of other companies than The Ohio Bell Telephone Company and to that extent it seems to me that the information is of a confidential character. We haven't any desire to retard the hearing or to prevent the other side from having the information unless it does go to that extent. And I would suggest Mr. Allen look over the matter when he gets home and furnish such information as he can consistently, and if that does not satisfy Mr. McConnaughey and the other gentlemen we will take the matter up further.

The Witness: I think we might—if I can have information as to what use is going to be made of it—I don't know as it would be at all helpful to companies in Ohio to have general wage data put in the papers in case they happen to be either lower or higher than the city in which they were used. It might cause us serious complications.

Mr. Burr: I think the point is well taken and should not be misunderstood.

Mr. McConnaughey: Alright.

Q. Now, Mr. Allen, a few more questions about the LaCrosse switchboard about which you testified in your direct examination. You have substantially the same sort of switchboard at Wilmington, Delaware, as I understand it?

[fol. 9340] A. Yes, we have a board in Wilmington, Delaware, that gives about the same operating conditions.

Q. But in a different way?

A. Some of the equipment for bringing about those conditions is quite dissimilar, but the operating conditions to which I was referring are rather similar.

Q. Are the same, yes—Now on page 462 you were referring to features of the switchboard, of the LaCrosse board, that you were using in different places. You stated, "We are using audible ringing signal, the machine ringing on A boards; we are using multiple line lamps, using automatic peg counts; we are using practically all of the features on those boards with the exception of what is termed—"; then you were interrupted and I cannot find that you ever completed that answer.

A. The socalled dark key shelf and the instantaneous disconnect. Those two features we are not using on any of the boards that we have installed; that is, we have them on certain boards that we have purchased.

Q. Dark key shelf, what is that?

A. That is an arrangement whereby the signals on the key shelf during the period when the calling subscriber is waiting for the called subscriber are both out, which makes it impossible for the operator to know whether the called party has answered.

Q. Is that a feature of the LaCrosse board?

A. Yes.

Q. How does that compare with the ordinary board in that respect?

A. On the ordinary board the signal on the calling cord [fol. 9341] burns, is lighted, showing the operator whether or not the called station has answered. That feature we have found no advantage, particularly in and it makes it impossible for the operator to time calls. In general on our board we have some AB toll calls which make it necessary for the operator to know when the called station answers. And further we consider it good operating practice, if a subscriber waits too long, for the operator to give a "No answer" rather than to leave the subscriber hanging indefinitely—leaving the operator without means to know when a "no answer" should be given.

Q. You have not recommended the automatic listening——

A. The automatic disconnect.

Q. Disconnect I should say.

A. Yes.

Q. What is that?

A. That is a circuit arrangement whereby when the calling subscriber hangs up his receiver his line is available immediately to an incoming call without the operator disconnecting the cord. It is possibly a misnomer to call it an instantaneous disconnect because the disconnect work of the operator has to be exactly the same with or without that feature. It simply means that the line is available for an incoming call on the average of two or three seconds faster.

Q. Why don't you use that?

A. We have not found that the advantages gained were enough to pay for the introduction of the necessary relays in the circuit to accomplish the disconnection.

Q. Now the features which assist the operator in expedit- [fol. 9342] ing the received calls on the LaCrosse board or the Wilmington board are not at all peculiar to those boards; as you have explained, they are a combination of well-known elements that you have the right to use and do use in different points and at different places; is that correct?

A. That is correct.

Q. The mechanical distribution of calls, which is one of the features of that board, is also old in principle, is it not?

A. That is in use in Wilmington and has been since 1916 when that Wilmington board was installed. I think the principles are still older than that.

Q. Was that installed at Wilmington by the Bell Company?

A. Yes.

Q. Now is that mechanical distribution of calls a feature of any of the boards in Ohio?

A. I think not.

Q. It is comparativey rate in practice any place, isn't it?

A. We have not been able to find any place where it was economical to put it in. I think it would be—I would expect it to be very rare.

Q. Can you name any other place where it is in use excepting at Wilmington and LaCrosse?

A. Yes, we have it on a board in Newark, New Jersey. It is what is called the Branch Brook office in the City of Newark.

Q. Those are the only three that you know of, is that correct?

A. Yes, sir.

Q. Do you know anything about The North Electric Company's auto-manual equipment?

A. Yes; I might correct my last statement. There is a distribution on the board in Lima which I have seen, yes. [fol. 9343] That board has automatic distribution. I would mention one other board too. There is a board in Defiance, Ohio. I don't know exactly what company is operating that. That has an automatic distribution. The system was installed by the Automatic Electric Company. I personally made a study on that board in 1917. It is a very small board and not a very efficient distribution scheme.

Q. Now you stated, on page 513, that the average time it requires to get through a call over the LaCrosse switchboard was seven seconds. I think, as I remember the figure, it was about 7 seconds; that is correct, is it?

A. I have looked — up—when I got back I looked up the definite study that was made on a similar study and I find I should have said 8 seconds, that the actual work time was 8 seconds.

Q. On the LaCrosse board?

A. Yes; I think I was thinking of the coefficient when I quoted that. The coefficient is about .7 on that board and the work time per call is about 8 seconds.

Q. Now in your answer you said in verifying that you found the figure on a similar board was that, as I understand you?

A. Yes sir.

Q. What was that similar board?

A. Warren, Ohio.

Q. That is not then the actual figure for the LaCrosse board?

A. No, we haven't a definite enough figure for the LaCrosse board that I would quote it as having been made on [fol. 9344] the LaCrosse board, although I did make some observation there to justify me in assuming that the work time would be the same there as in the other boards, such as Warren, where we had made intensive studies.

Q. What you intended to say in your direct examination was 8 seconds instead of 7?

A. Yes, I should have said 8 seconds.

Mr. Burr: What is the page, if you please?

Mr. McConnaughey: 513, at the bottom of the page.

Q. Tell us about the Warren board; is that substantially the same as the LaCrosse board?

A. As far as the operation is concerned it is the same. The Warren board is a small board and they get the distribution on it by actually providing a multiple of the line lamps throughout the boards which gets practically the same conditions as far as the operator is concerned as in Warren, where the calls are distributed to line lamps by the mechanical distribution.

Q. You mean at LaCrosse?

A. Yes, at LaCrosse; I should have said LaCrosse.

Q. Well, now, in that connection you mention the work time on the No. 1 C board in Youngstown as about 8½ seconds; that is correct, is it not?

A. Yes, I verified that. That is actually 8.7.

Q. I said about 8½. Now in both of these cases you refer to the work time; is that the time during which the operator is actually engaged in handling the call?

A. Yes, sir.

[fol. 9345] Q. It does not include the time that the subscriber consumes in lifting the receiver—does that include

the time between when the subscriber lifts his receiver and lights his lamp and the operator connects with him?

A. No, that is entirely the work time of the operator; it has nothing to do with the subscriber.

Q. There would be a little additional time in connection with the call during which the operator was getting in on the line, wouldn't there?

A. Yes, and there would be a little additional time on the average before she started to get in on the line. A man takes his receiver off and there will always be some interval before the operator sights it and starts for it.

Q. And that time is not included in with this 8 seconds of this 8.7?

A. No, sir, it is entirely the operator's work time.

Q. Now is there any difference in the time between the operator's lifting the receiver and the operator getting in —the subscriber lifting the receiver and the operator getting in on the line at LaCrosse or at Warren and at Youngstown?

A. In all the load figures and the work time figures which I am quoting to you, we are assuming to keep those intervals the same. That is, we increase the operator's load and in doing so we base operating—what we would consider the standard operating load on the same speed of answer as you might call it, that is the time from the time the subscriber takes his receiver off and gets an answer—we are basing [fol. 9346] the loads or giving the same speed of answer on all these different types of boards in connection with the work time coefficients which I have mentioned.

Q. What is the standard speed of answer?

A. Why just what do you——

Q. You used the term. I want to know what you mean by it.

A. No, I do not think I used that term.

Q. I think you did in this last answer.

A. I think we based it on the same speed of answer. I don't think I used any term such as standard.

Q. Make it the same speed of answer.

A. I will take any figure you give.

Q. What do you mean by speed of answer?

A. That is the time from when the subscriber takes his receiver from the hook until the operator says "Number."

Q. There is no reason why they should not be the same on

a board such as at Warren and the one at Youngstown so far as the board is concerned?

A. No, sir. It is controlled entirely by the number of operators provided at the board to take care of the calls, which gets back to the question of what load you provide for the operators.

Q. Have you any work time figure for the Lima board? Do you recall the work time figure for Lima?

A. No, I do not.

Q. Or Defiance?

A. I don't recall that exactly. Defiance was very similar to the work time on the Warren board, I should say not far from the 8 seconds.

Q. Well, then if the distribution of calls on the LaCrosse [fol. 9347] switchboard effects a cutting down of the speed of answer, that is not reflected in this comparison that you make between 8 and 8.7, is it?

A. I stated that just as clearly as I could, that those figures were based absolutely on the same speed of answer on both boards.

Q. Yes, and if there is a difference in the speed of answer in favor of the LaCrosse board that is not reflected in your figures at all, is it?

A. I cannot state any plainer that there isn't any difference in speed of answer on the two boards with those two work times I have quoted. The work times I have quoted are based on exactly the same speed of answer on the two boards.

Q. That is true. Then the difference in the speed of answer, if there was a difference in the speed of answer, would not be reflected in the figures you have given at all?

A. At the time the studies were made on which these figures were quoted there was no difference in the speed of answer on the boards, as we maintained the same speed of answer for the studies on all of the different types of board.

Q. Now you are including in that the boards which you studied, which were Warren and Youngstown, is that correct?

A. In general I was including all of the different boards on which we are continually making studies.

Q. And that does not include anything about the LaCrosse board because you did not make a time study of that?

A. We made no detailed study. I made enough to confirm my opinion that conditions were the same as far as those

[fol. 9348] factors were concerned in LaCrosse as they were in the Lima board.

Q. That is, you did not make a stop-watch operation there. You simply watched them operate?

A. I made a few stop-watch observations, not enough to constitute what we consider a complete study.

Mr. Burr: You said Lima; did you mean Warren?

The Witness: Warren. I am referring to LaCrosse and Warren.

Q. I will ask you what sort of an observation you made at LaCrosse particularly now?

A. I made a number of observations. But in order to derive a figure on which we would base complete data it would be a matter of some months and we did not make such a study in LaCrosse. We simply made a study of a couple of days to determine that the operating features in LaCrosse made no difference in the problem that the operator confronted as compared with Warren where we had made a very complete study.

Commissioner Poor: We will recess until ten o'clock tomorrow morning.

Mr. Burr: Your Honors, before you recess, I should like to make one short statement. I notice from time to time there have been, and are still being, filed in this case long lists of names purporting to protest against the rates involved in this proceeding, the list being filed under the name of the State Citizens Association, or some such designation. It has come to my attention recently that these petitions are [fol. 9349] circulated by solicitors who solicit names and subscriptions at the same time and who are paid for their zeal in securing subscriptions 40 per cent of the amount that is collected by them.

In the City of Columbus it is my understanding that the promoters were arrested at the outset of this movement; that in the City of Cleveland solicitors have been requested to leave the city by the better business men of that city, and that in Marietta, and perhaps some other places, the same thing has happened.

Now, of course, protests signed by names, be they many or few, mean nothing, because of course the names have been signed without any consideration on the part of the signers whether the proposed rates involved in this case are or are not reasonable. I do not care to dignify these

protests by any further reference to them except to say that if the Commission shall at any time during the progress of this hearing desire proof of the facts which I have stated with reference to the manner in which these petitions are circulated and the basis on which the solicitors circulate them, I believe that the evidence can be produced before the Commission.

And thereupon the further hearing of this matter was adjourned to 10:00 o'clock Tuesday Morning, May 13th, 1924.

[fol. 9350] Tuesday Morning Session

May 13th, 1924.

And thereupon the further hearing of this matter was resumed, pursuant to adjournment.

Present:

Same counsel as at previous hearing, and Carl F. Shuler, on Behalf of the City of Cleveland.

And also ARCHIBALD J. ALLEN, resuming the stand for further cross-examination, continued his testimony as follows:

Cross-examined by Mr. McConnaughey:

Q. Your personal investigation of the LaCrosse board was confined to this one trip when you inspected it?

A. Yes, sir.

Q. When was that?

A. I think that was in December, 1922.

Q. Have you the standard or average number of calls per hour for the Youngstown board?

A. That would depend on certain features which touch the percentage of calls that would go to party lines and some elements of that kind. There isn't any one load figured—that is, the coefficients that would apply to that board would be .87; that is .87 units for a call to an indi-
[fol. 9351] vidual line, and certain modifications are made based on the percentage of calls that would go to party lines. The average load on the board assuming an average amount of party line business would probably be about 175 calls—275 calls to the hour.

Q. 275?

A. Yes.

Q. And the LaCrosse board?

A. Assuming about the same percentage of party lines there it would be about 320 busy hour.

Q. What average of party line calls do you assume there?

A. Why, I would assume, without figuring it down to an exact point—I am assuming around 20 or 25 per cent on the calls going to party lines.

Q. And what percentage trunked?

A. I am assuming no percentage of trunks. That is, those boards are ordinarily not installed in cities having much trunking.

Q. And for the Wilmington board?

A. Just about the same as for the LaCrosse board.

Q. 320?

A. About 320.

Q. And Warren?

A. The same as LaCrosse.

Q. Are there any of the elements of the LaCrosse and Wilmington boards other than the automatic ringing adaptable to facilitating calls between A and B operators or the completing of calls by B operators?

A. Well, there is very little of any connection between the operation of an A and B board. That is, I assume you could put some of these features, such as the automatic disconnect and so on, in connection with the B end of the trunked calls; I don't know of any place where that has been done or any value that you would get from it. I think [fol. 9352] the machine ringing would be the only one of any definite helpful application to the B board.

Q. And that is pretty generally adopted, isn't it, on the B board?

A. Yes, sir.

Q. How about distributing calls between the A and B boards by machine; has that been done?

A. Yes, there has been some experiment on that. I don't think that the equipment as developed for an A board would be suitable for use on a B board for that purpose. There would be some gain on the ability to distribute calls at the B end.

Q. Has that been done in any instance that you know of?

A. Yes, we have done that in connection with some of our boards. We have done it in connection with our call indicator positions where we have traffic coming in from

the machine switching offices where we have arranged for team work.

Q. Where?

A. We do it in general wherever we have more than one position; as soon as we get so that we have more than one position of traffic coming in from machine switching offices we arrange for team work between those positions so that we get the team work on the part of our B operator.

Q. By the equipment for machine distribution of calls on a B board?

A. Yes, by special equipment that has been developed to accomplish that purpose.

Q. Now you say that is pretty generally in use in your system?

A. Wherever we have machine switching offices in a city [fol. 9353] we have these positions arranged in that fashion.

Q. Name some of them where that is in use? Are there any in Ohio?

A. No. I know of none in Ohio. It is my understanding that the consolidation with machine switching offices has not been completed so that I do not know of any call indicator positions in Ohio, although there may be. I am not familiar enough with the local situation to say.

Q. Where are there any outside of Ohio?

A. Chicago, Detroit, New York, Kansas City, Omaha; various cities; a large number of cities throughout the country.

Q. Minneapolis?

A. Yes, sir.

Q. And St. Paul?

A. Minneapolis and St. Paul.

Q. I understand that on the LaCrosse switchboard the answering jacks are multiplied so that one operator can assist another without reaching over to the other positions; is that correct?

A. No; the answering jacks are multiplied in each section of the LaCrosse switchboard the same as our answering jacks are placed in all of our boards, and the operator either answers the call on an answering jack on her own position or on the adjacent position to the right or left. As far as the operator's reaching to the right or left for a call, there is nothing different on the LaCrosse board than is true in general on all boards throughout Ohio.

Q. The ability of operators to handle more calls during the busy hours means, as you have explained in connection with several of your savings, fewer A switchboard positions [fol. 9354] for a given number of lines with a given volume of traffic, doesn't it?

A. That is true.

Q. The supervisors for the smaller number of operators could be reduced at least proportionately, can they not?

A. Generally proportionately, yes, sir.

Q. Can't they sometimes be reduced even more than proportionately?

A. No, I would say that the tendency would be the other way, that it is more difficult to adjust supervisors—the smaller the force you get, the more difficult it is to arrange supervisors efficiently. That is true of most anything where we have a number of people working, that we can fit in the tours of duty and do a closer job of adjusting if we have a considerable number of people. As you reduce the number of A positions it becomes a more difficult job to provide supervisors just enough and not too many.

Q. The smaller the force of operators the fewer difficulties may be expected in hiring and training and retaining competent girls in sufficient numbers; that is true, I suppose?

A. Yes, I think in general that would be true.

Q. Whatever waste there may be in the slack time of operators who are necessary for the short peak loads periods is reduced in greater proportion than the direct reduction in the maximum number required; is that not to be expected?

A. I think that is exactly contrary to the condition. The exact opposite would be the fact.

Q. Why?

A. For the reason which I have stated just now, that the——

Q. The larger force is the more flexible?

[fol. 9355] A. It is more easy to make a careful and exact adjustment with the larger forces and with the natural flow of the traffic. We have found that to be the fact, that those schedules are more easy to adjust efficiently than when we reduce the force.

Q. On the LaCrosse switchboard the answering jacks are

more compact than the ordinary board as it is pictured in your Exhibit No. 1, are they not?

Mr. Burr: What do you mean by compact?

Mr. McConnaughey: Closer together, more in a given space, fewer jacks for the number of lines.

The Witness: Well, now, you are getting two or three elements in. That last statement, "fewer jacks for the number of lines", the answer to that is yes, but that has no relation to the compactness of the answering jacks.

Q. I see that. Now answer the first question as to the compactness?

A. No, there is nothing in connection with the LaCrosse board that makes for any difference in the arrangement of the answering jacks. The answering jacks can be arranged in 10 per strip or 20 per strip, depending on the conditions in the office; there is nothing in connection with the LaCrosse board that would have any effect on the way the answering jacks would be placed on the switchboard.

Q. Well, there are fewer answering jacks on the LaCrosse board; that was your answer, wasn't it?

A. Yes, the lines are terminated on switches, and those switches—trunks from the switches to the answering jacks, and that is the mechanical arrangement in the LaCrosse [fol. 9356] board, and the expense of providing those switches is one of the difficulties in the LaCrosse board which more than offsets the traffic saving.

Q. As you figure it?

A. As the conditions in LaCrosse definitely show.

Q. And the smaller number of answering jacks leaves more room for multiple jacks on the board, doesn't it?

A. Now you are getting onto another subject. The LaCrosse board uses more answering jack space than we ordinarily use on our board and they have less lines terminating on any one answering jack but the fact that they multiple the answering jacks throughout the board results in their using up more answering jack space than is ordinarily used on the standard board, so that you have no more space left for multiple.

Q. That element of the space occupied by the answering jacks is a thing that is controllable in the arrangement of a board on the plan of the LaCrosse board?

A. If you do not multiple the answering jacks then you

do away with one of the principal features of the LaCrosse board and save answering jack space; you could not have the answering jack space and gain the advantage which they claim for the LaCrosse board.

Q. Now, I understand your testimony to be that the effective operation of a switchboard with the elements of the LaCrosse board is not dependent on the particular device that they use there. You have got the same result at Wilmington or at Warren, Ohio, with different devices, [fol. 9357] haven't you?

A. Yes, sir.

Q. And they were devices which have been used for a long time in one way or another?

A. Yes, simply different arrangements of them.

Q. Simply a different arrangement?

A. Yes.

Q. The matter of whether or not you would recommend, or that sort of equipment would be recommended, is entirely a matter of cost?

A. Well, it is a matter not only of cost but of the conditions in the office. That is, a certain type of board is suitable in a city where the ultimate number of lines might be 1000 lines, and some other type of board is suitable where the ultimate during the life of the board might be 3000, and if you would have a large city where you would have one office having up to 10,000 lines with several offices using the large units, you would use still other types of boards; so that the condition in the city in regard to the size would be rather controlling.

Q. What is the capacity of that LaCrosse board?

A. The LaCrosse board I would say would have a capacity of possibly 8000 lines.

Q. Is that the maximum capacity?

A. It would depend entirely on how much outgoing trunking there might be. That is, if you go to a large enough city it might be that you would not have room left for any subscribers multiple. It might require all of the space above the answering jacks for out trunks. But if you are confining the question to a single office city, the LaCrosse board could go to the capacity of about 8000 lines.

[fol. 9358] Q. And it is adaptable or available for use in a multi-office city, is it not?

A. A great many of the economies of the LaCrosse board

would be lost when you introduce it into a multi-office city. Many of the features which I have enumerated for you would have no beneficial effect in the way of saving operating time on the A Board if the call had to be trunked to a B board, so that the LaCrosse board would be not nearly as efficient when in a multi-office city. The fact that it does not prove in in a single office city would, by just that much more, indicate that it would not save enough in traffic to pay for added expense in a multi-office city.

Q. The big objection to the LaCrosse board from your standpoint is the matter of cost, is it not?

A. Yes.

Q. From your investigation you do not think it proves in in any situation in connection with which you have given it consideration?

A. Yes.

Q. There are certain savings in its favor which you think are offset by equipment cost?

A. Which are more than offset. There are definite traffic savings that are more than offset by plant charges.

Q. I want to refer again for a few moments, Mr. Allen, to your Exhibits 9 and 12. You have copies of them there, haven't you?

A. Yes.

Q. Take Exhibit 9, which is the curve or chart which shows the number of calls in your typical business office at various half hour periods during the day. Tell us from that chart what is the number of calls from 12:00 o'clock midnight to 8:00 o'clock in the morning on the average?

[fol. 9359] A. Why, those calls are not shown on here, as the fact in connection with adjusting force is that we are controlled in the number of people we put on for all night by the traffic between 10:00 and 11:00, or the early morning hours. We cannot send operators home after half past ten or eleven, so that at night our force is not scheduled, and in general the time of the night operators is used in such routine work as is necessary, handling tickets or making certain routine tests of equipment or things of that kind. So that we do not keep the traffic in detail from 12:00 o'clock at night until 6:00 in the morning.

Q. Tell us what it is between 6:00 and 7:00, according to, this chart?

A. That is not shown on this chart. The curve on here

starts between 6:00 and 7:00, starts at zero without showing the number of calls there. The chart was simply drawn up to show the variation in traffic from hour to hour during the business hours of the day.

Q. During this period when your chart does not show the number of calls for this reason you were carrying, according to your Exhibit 12, six operators; that is correct, isn't it?

A. Yes, and we showed a schedule of six all night operators.

Q. Now you were carrying six of these operators all night and until 8:00 o'clock in the morning; that is correct, is it not?

A. Until 7:00 o'clock in the morning. The night operator's tour of duty is ordinarily from 10:00 in the evening to 6:00 in the morning. That is what is shown on this exhibit.

[fol. 9360] Q. Isn't it 7:30?

A. We bring additional day operators on according to the figures shown on the schedule at 7:00 o'clock and at that time they relieve the night force. That is, the night force are shown definitely as terminating their tour of duty at 6:00 o'clock in the morning.

Q. It starts with six at 7:00?

A. That is our day operators.

Q. You have six operators on in the first half hour of the day trick, don't you?

A. Yes.

Q. You do not even get seven until 7:30?

A. They are night operators. I understood you were talking about night operators.

Q. I am talking about the number of operators?

A. That is shown definitely as six operators, day operators, who are started at 7:00 and are on until 7:30, yes.

Q. And ten you take on more; at 7:30 you have seven?

A. Seven additional operators that start to work.

Q. Which makes the total number 13?

A. Yes, sir.

Q. So that up to 7:30 you have six operators?

A. Yes, sir.

Q. And from 7:30 to 8:00 you have 13 operators; that is correct, isn't it?

A. That is correct.

Q. Now from 7:00 to 8:00 o'clock what is the average number of calls according to your Exhibit 9?

A. Well I could not read the calls exactly from this. And in order to make up the schedule the exact calls each hour were used from the bigger data on which this curve was [fol. 9361] drawn. The curve was introduced entirely to show the hour to hour's variation in traffic, and on this scale where a thousand calls—on this small base, I would not attempt to read the exact calls.

Q. It was not to exceed 800 and not less than 100, according to the indication of that curve, was it?

A. The operator requirements as shown on the top line on the form are taken definitely from our standard table in traffic circular No. 117, and the operators as shown there are the requirements based on the traffic of those half hours.

Q. Yes, I know it is based on 117; but I want to find out how it is based on the number of calls. Now the number of calls during that period from 7:00 to 8:00 was less than 800, was it not?

A. Yes, I should say that it was.

Q. And it would not average more than 200, would it, the way that curve is drawn; practically very little during the half hour and a short rise at the half hour. How is this chart made? In that square between 7:00 and 8:00, how do you determine where to locate that?

A. It is located at the half way point.

Q. At the half way point in the hour; then the average for that period would be where that angle is, wouldn't it?

A. I assume so; some place in there.

Q. That would not exceed 200 for that half hour?

A. I would say it might slightly exceed 200.

Q. About 200?

(No reply.)

Q. And during that period you had six operators and [fol. 9362] there was an average of 63 calls for each one of those operators during that period; is that correct—33, I should say?

A. I think that would be probably about right.

Q. From 8:00 to 9:00 o'clock what is the number of calls indicated by this chart, about?

A. About 1400.

Q. About 1400?

A. Yes, sir.

Q. During that period you have how many operators?

A. We have a requirement of 19 operators.

Q. And you furnished how many?

A. Well, operators were provided, 35 between 8:00 and 8:30 and 51 between 8:30 and 9:00.

Q. Your required number there was 19; what would be the average per operator on that basis if there were 1400 calls during that period—77, wouldn't it?

A. That is right.

Q. Now what is the traffic between 4:00 and 5:00 in the afternoon?

A. There was about 9800 calls.

Q. What between 5:00 and 6:00?

A. About 5000.

Q. And the operators required is how many?

A. 43.

Q. And the average number of calls is 116, isn't it?

A. It is 5000 divided by 43.

Q. That is 116?

A. I cannot do that in my head; I will figure it out if you want me to.

Q. Alright, I wish you would see whether it is correct or not?

A. That is 116; that is right.

Q. From 6:00 to 7:00 the number of calls is how many-

A. About 1000.

Q. The number of operators required is——

[fol. 9363] A. 17.

Q. The average number of calls is 59?

A. I assume that is correct.

Q. Between 7:00 and 8:00 what is the number of calls?

A. Approximately 500.

Q. And the operators required is 10?

A. Yes.

Q. And the average number of calls is 50, is it not?

A. Yes sir.

Q. Now between 8:00 and 9:00 what is the number of calls?

A. Between 2 and 300; I don't think you could read it exactly in there.

Q. And the number of operators required is six?

A. That is right.

Q. And the average number would be 1/6 of, say, 250?

A. About 40 calls.

Q. And between that and 10:00 the average number of calls is what, the average number of calls is what?

A. About 200.

Q. And the number of operators is six?

A. That is right.

Q. And the average number is 33?

A. That is right.

Q. Now, none of those operators during the hours I have called your attention to are working anywhere near 153 calls per hour, that is, the average for that typical instance, are they?

A. No, they are not.

Q. And to that extent there is a surplus of operators on that board, is there not?

A. No, there is no surplus of operators on that board.

[fol. 9364] Q. Why not?

A. The calls during that period are coming in from a large number of lines and there is a very little fluctuation in the traffic from day to day so that we have to allow a larger number of operators during those hours so that they can attend to the calls promptly as they come in during side hours.

Q. That is against the possibility that there may be a sudden peak develop during the night on account of some unexpected happening is that what you mean?

A. Yes. When you have an office such as an office of this kind would be, with approximately probably 10,000 lines, with possibly close to 20,000 stations, the chances for variations and fluctuations in traffic during side hours become very great. You may get a variation——

Q. So great that you have to carry a great many operators who are not working within 20 per cent of their capacity during those night hours?

A. That is the result of very careful studies; we have decided that this is the proper provision for operators to make on a board of this kind.

Q. Now that is not the question I am asking you. The question is, don't you have to pay for a great deal of time during which these operators do not work to anything like their capacity? As a matter of fact, not to exceed one-third of their capacity during most of the time—these hours that

I am mentioning right now and about which I have questioned you?

A. With the exception of the hours during the night—I have stated that during the period from 11:00 o'clock until 6:00 in the morning there is a considerable period of time [fol. 9365] when the calls become so few that the operators are not busily engaged and during that time we assign to this night force such routine duties as testing out cords and work of that kind that keeps them busy, so that their time is used with reasonable efficiency. Of course these girls being in there for all night does not mean that there are six girls in the operating room all night. Every girl is entitled to a rest period during the night. The night is her day's work. She is entitled to a lunch period during the night. So that for a considerable period of the night we would only have four operators taking care of the traffic from, say, in the neighborhood of possibly 20,000 stations.

Q. And excepting for the time when they are taking their lunches or their regular rest periods that they are entitled to, they are now busy during this night period, are they?

A. Yes, they are assigned the various duties to keep them busy during that period.

Q. And they do keep them busy, is that correct?

A. That is correct.

Q. Now you have talked about this night tour from 11:00 to 6:00; how about these hours that I have asked you about which run from 7:00 to 9:00 in the morning and from 5:00 to 10:00 in the evening? They haven't these extra duties during that period, have they?

A. No; during that period the variations in traffic which I have mentioned and the difficulty of handling the calls on several positions rather than on one position keeps the girls during the periods of high traffic busy and during the [fol. 9366] other periods they are available for the calls which may come.

Q. That is, during the hours between 8:00 and 9:00 a girl is as busy handling 50 calls as she is or would be handling 153 calls between 9:00 and 5:00 where there is a full force; is that the distinction you want to make?

A. No, I would not put it that way. In order to get the line signals answered as promptly during that period as during other periods of the day it is necessary to provide this number of operators.

Q. You do not mean to say that these operators are work-

ing to their full or their reasonable capacity, however, during these hours from 5:00 o'clock in the evening until 10:00?

A. Their work is rather different from what it is during the straight hours of the day when the board is full. That is, they have to take calls on more than two or three positions and they have to be available to answer the signals as they come in, taking into account this very large fluctuation in traffic during such hours as I have mentioned.

Q. Now you keep on explaining, but you do not answer my question, which is, are they as busy in handling a full load during the other hours of the day?

A. I don't know as that question can be answered. I told you that their work is different during that period and when you compare two things that are different you cannot answer it with yes or no. As I have explained to you, these girls are busy on things during that period and that their work is somewhat different than it is during the other hours of the day.

[fol. 9367] Q. You want us to understand, if I get your answer correctly, that they are as busy handling 50 calls between 8:00 and 9:00 o'clock, when there are only six on duty, as they are handling 153 calls during the busier portions of the day; is that correct?

A. No, that is just another way of asking the same question that I told you could not be answered yes or no a moment ago. They are efficiently occupied during that period and are necessary to answer the calls promptly as they come in.

Q. During this period you think that they are so busily occupied that it is fair to count this saving of one second on the calls that you have counted in connection with the tinsel cord saving and a saving of half a second on some of the other items you have mentioned in connection with these night calls?

A. Yes; these operators are provided, with the exception, as I have stated before, with the exception that during the period from 11:00 o'clock at night until 6:00 in the morning, the operators are provided entirely on the basis of the number of calls, and if those calls are for any reason made easier to handle the provision of operators would be less. That is, for instance on these calls which you have asked me to read from a curve; this curve, as I told you in my direct testimony, is entirely a curve of the calls originating in a business office, and in reading off the calls that occurred between odd hours of the morning and evening—those calls

might, and undoubtedly were, a very much larger proportion of those calls, from pay stations than would be the case during the business hours of the *of the* day, the offices largely [fol. 9368] being closed, and a great deal of business coming from pay stations, which would mean that an ordinary pay station call is much more difficult to handle, so that the operators are provided entirely on the basis of units and not of calls, and the difficulty in getting this straightened out is in your taking this exhibit, which I put in entirely to show the variation, and trying to use it as a base for adjusting force—and I explained in my direct testimony we would have to have the units and that we would use the units in providing a schedule of operators and that this curve was introduced entirely to show variations in traffic and could not be used for the purpose for which you are trying to use it.

Q. You do use the number of calls per hour in figuring the number of operators to use during a given hour, don't you?

A. No, I have stated repeatedly we do not. We use the units.

Q. I know you use the units, but you use the coefficients in connection with the units that is based on the number of calls?

A. No, the unit is not based at all on the number of calls.

Q. How about your coefficient?

A. The unit is the result of a definite set of studies in which we develop the units, and the units for every class of calls are different, as we have several tables of coefficients applying to different classes of calls to reduce them to units.

Q. Do you want me to understand—it is exactly what you [fol. 9369] have said—that you do not consider the number of calls at all in working out your assignment of force?

A. The number of calls multiplied by the coefficient that applies to those classes of calls reduces those calls to units and then we have a basis on which we start in adjusting our forces.

Q. Then the data that is chartered there is of some value in getting at the number of operators, isn't it? It is the thing from which you start?

A. No, Mr. McConnaughey. We would have our counts made according to the classes of traffic, such as pay station——

Q. What would you count?

A. We would count all of the different classes of calls.

Q. Yes, you would count the calls, wouldn't you?

A. Yes, sir.

Q. Still you say the number of calls is not at the basis of this calculation?

A. No, I would say that the number of calls is reduced to some common term from which we can work, as you cannot provide seven men to build a house regardless of whether it is a brick house or a wooden house, and you cannot provide seven operators to handle so many calls regardless of whether they are pay station calls or flat rate calls.

Q. Now that remark is not germane to this situation because my question has been directed exactly to the typical office that you used in providing these two exhibits as to which you were supposed to have in mind every one of these elements you have mentioned. Now do you have this in [fol. 9370] your mind?

A. I will start all over again. I stated that in providing the requirements——

Q. Well, now, wait a minute. Please answer my question. Didn't you have in mind in all of your testimony and in preparing these exhibits a typical office with all of the elements that need to be considered in arriving at this result in Exhibit 12?

A. Yes, and we considered those and used them, but you insist on going back to this curve which does not contain all of the elements.

Q. I am only going back to that curve for one thing?

A. And it does not show that one thing.

Q. And if it is drawn correctly it is based upon that one thing, the number of calls, isn't it, during these different periods?

A. You have just asked me and I have explained to you that we used all of the elements that apply in the case in arriving at the requirements and all of the elements are not shown on that curve.

Q. Now what are the other elements that have not been exhibited here?

A. The percentage of trunking, the classes of calls, whether they are prepay station calls or message rate calls, all of those different elements enter in to the proposition of figuring the requirements.

Q. Do they enter into the determination of your coefficient?

A. No, they enter into determining the number of units each half hour.

Q. Now you give us these different elements for this actual office you figured on in exhibit 12?

A. The classes of calls that go to make up the calls as [fol. 9371] shown here and the percentage of trunking that applies in the office are the principal elements.

Q. Now, what are they? What are the classes of calls and the number or whatever it is you figure on with reference to this typical office that you are testifying about in Exhibit 12?

A. I haven't any such data as that. I was not asked for it. I was simply asked if I would bring the operators required to fit this office and I provided that as shown on the top line in this exhibit.

Q. You did have this information when you were making this exhibit?

A. Yes, sir.

Q. You haven't it with you, that is what you mean to say?

A. That is true.

Q. You can produce that for us?

A. I would be glad to see if it is preserved. I do not know that it is. I did not consider that as an element. You just simply asked for the requirements. If I can find it I would be glad to. It is nothing but what is used in day to day operation. That is, it can be provided for any office. You can get it for Dayton or any office you would like to see it for. It is nothing but what is set up as standard and any one that is familiar with force adjustment routines would have that and could produce it for most any office.

Q. Suppose you produce a typical exhibit of that kind with all of the data for Dayton, for instance?

A. I haven't any such data as that.

Q. But the traffic department of the Ohio Bell Company doubtless do have?

A. I think so.

[fol. 9372] Q. Now you have testified to certain savings on the audible ringing development, savings in operation, I believe?

A. Yes, sir.

Q. That was developed by the A. T. & T. when?

A. About 1914 or '15. There was previous to that time an attempt made to get the audible ringing system and it had been used in some of our cities for several years previous to

that, but it was not of a type that was uniformly satisfactory, and the present arrangement whereby we feel justified in recommending the equipment was developed during the period of about 1915.

Mr. Burr: Are you now referring to the audible ringing tone?

The Witness: Yes, sir.

Q. How long prior to 1914 or '15 was it in use in any of your offices?

A. Well, to my personal knowledge it was in use as far back as 1910. I haven't any knowledge as to how much previous to that time it had been used.

Q. As a matter of information, in your department in your connection with the A. T. & T. Company, don't you know that it was in use in Chicago as early as 1900?

A. I don't know that, no. I know it was in use in Chicago sometime previous to 1910. I knew it was in use in 1910 because I did some work on it there at that time, but previous to that I have no definite knowledge. We found in that time that it was not of a type which we would consider satisfactory.

Q. But it was in use in Chicago, and continuously in use? [fol. 9373] A. A form of the audible ringing signal was in use in Chicago in 1910 and was continued in use.

Q. Do you know Mr. R. F. Estabrook?

A. Yes, sir.

Q. Who is he?

A. He is the general traffic manager of the New England Telephone & Telegraph Company.

Q. If he states that the audible ringing tone was in use in 1900 you would think that that was probably correct, wouldn't you?

A. Why, the only think I know about the signal was that it was in use in 1910. I don't think my opinion as to Mr. Estabrook's veracity would be very helpful. I think he is truthful.

Mr. McConnaughey: "I think" is a very good answer to that question.

Mr. Shuler: Why do you say you think? Do you have some suspicions about the A. T. & T. or Bell witnesses?

Q. Well, prior to 1914 the automatic ringing was furnished by independent manufacturers, such as Kellogg and the

Automatic Electric, wasn't it—the automatic ringing we are talking about?

A. You are referring to machine ringing?

Q. Yes.

A. Machine ringing had been used in certain installations. We made experiments with machine ringing several years previous to the dates when it was developed to the point where it was satisfactory for general application; and for a few years previous to that time it had been developed to the point where it was satisfactory in offices where there were no party lines. That, of course, limited its usefulness to a very few places, and at the time that it was finally developed [fol. 9374] to a point where it was satisfactory it was adapted to use in offices having party lines, and that work of developing it and adapting it to party lines was carried on by the General Staff. And that information was supplied to the company, I think, as I have stated, about 1912.

Q. However, prior to that it had been used by independent companies in automatic installations, had it not, and manual installations?

A. Not to my knowledge. I know that it had been used sometime prior to that by Bell Companies in offices having no party lines.

Q. Mr. Allen, on page 434 of your direct examination you stated, at the bottom of the page—no, wait a minute; wait until I find the exact place—not at the bottom of the page but the first question that begins on that page. The question is: "Does the Long Lines Department of the American Company have its own traffic engineers?" Your answer was this: "It has a force of traffic engineers who are responsible for carrying on the field traffic engineering work in connection with the specifying of equipment necessary in the operation of the offices operated by the Long Lines Department." Now what offices are operated by the Long Lines Department?

A. Well, I don't know as I can name all of them. The A. T. & T. Long Lines Department operates an office in Boston, an office in New York City, an office in Buffalo, an office in Cleveland, an office in Detroit, an office in Chicago, an office in St. Louis, an office in Kansas City, an office in Louisville, an office in Memphis, an office in Milwaukee, an [fol. 9375] office in Minneapolis, and possibly in certain other places. I am not sure.

Q. What sort of offices are they?

A. Those are operating rooms where Long Distance calls are handled.

Q. Are they conducted in connection with local exchanges in those places or are they entirely separate from the local exchanges?

A. They are separate, under the management of the Long Lines Department, and are not part of the local operating offices in those cities. They are distinct offices.

Q. Are they located in the same buildings?

A. In some cases in the same buildings.

Q. In some cases not?

A. In other cases they are not.

Q. What did you mean, on page 475, when you stated in that same connection: "We have no offices which we operate ourselves."

A. I was talking in connection with local offices and in connection with the General Staff of the A. T. & T. That is, the General Staff operates no offices. I stated in the early part of my testimony, part of which you read, that the Long Lines operating Department was considered by us exactly as one of the Associated Companies, and the General Staff does not operate those offices. That is the Long Lines Department operates the offices I have just mentioned.

Q. Alright. It seemed to me to be a bit inconsistent. I wanted to clear it up.

A. I am very glad you did.

[fol. 9376] Q. Now on page 450 of the record and elsewhere you mention operators wages of the Bell Companies and you have discriminated in your cross-examination between Associated Companies and the Long Lines Companies, between local exchange and toll operators wages, so that your statement is that the system as a whole is spending $105,000,000.00 a year on actual operators salaries; that is approximately correct?

A. Yes, sir.

Q. Most of the work that these companies spent this $105,000,000.00 for could be done by machinery, could it not?

A. Yes, the introduction of machine switching would take care of a great deal of that work which is now being done by operators. There would, of course, be necessary a considerable number of operators to handle special calls, information calls and so on, but a great deal of that would be handled by machine in a city where machine switching was introduced.

Q. You have introduced it in some places?

A. Yes, sir.

Q. On a very small part of it, however, compared to the total number of telephone offices, isn't it?

A. Yes.

Q. You were investigating the subject of machine switching as long ago as 1910, were you not?

A. I think we were investigating considerably previous to that.

Q. Even before that?

A. Yes, sir.

Q. And you personally investigated the system here in Columbus in the year 1910, did you not?

A. No, my recollection is that that was either 1911 or 1912, [fol. 9377] I would not be positive. It was along in that period.

Q. Now you made a careful and systematic investigation of the system that was in operation here at that time, whenever it was?

A. Yes, sir.

Q. You found it working satisfactorily, didn't you?

A. Well, I would have to qualify that. I could not make that statement. We found that it was working with a reasonable degree of satisfaction. There was considerable error and considerable trouble on it, but we found it working.

Q. What kind of error; what kind of trouble?

A. Cases where the subscriber, in attempting to get a number, got wrong numbers or double connections or cut-offs.

Q. A larger proportion of that sort of trouble than on the manual boards at that time?

A. Yes.

Q. It was satisfactory to the subscribers, however, was it not?

A. Yes, I think more satisfactory to the subscribers in Columbus than the manual service was at that time.

Q. You found that about 65 per cent of the subscribers, according to your estimate, were better satisfied with it than they were with the manual board, did you not?

A. I haven't exact data on that point with me, but that is about as I remember the condition.

Q. You testified to that at Indianapolis, did you not?

A. Yes, sir, but I would not attempt to remember the exact percentage; somewheres in that neighborhood.

[fol. 9378] Q. About 65 per cent?

A. Yes.

Q. Did you make any study of the relative cost of the two services here in Columbus at that time?

A. Why, the Citizens Company's records were in such a deplorable condition that we could not make a very definite study. In fact, we could not find out within approximately a thousand stations of how many they had, so that we were not able to make a very decided study as they did not know within some 60,000 calls of how many they were handling and they could not even from their records find out how many stations they had, so that you could not make a very definite cost study.

Mr. Burr: Was Mr. Johnston in charge at Columbus then?

The Witness: He was.

Q. Did you determine the cost of the service, I mean the total cost of the service as it was being operated at that time?

A. No, after we found the difficulty in getting any real figures of that kind we confined our study almost entirely to a study of the grades of service which were being given under the two systems and the feeling of the subscribers as near as we could get it with regard to the two.

Q. Well, you found it to be satisfactory?

A. With the qualifications which I gave a few moments ago; that is, we did not find the grade of service being given which we felt we could give to subscribers in general throughout the country.

[fol. 9379] Q. What was the purpose of that investigation?

A. It was the same purpose that we have continually in mind wherever any new method or new system is originated, either by our own people or by any independent people. We at the first opportunity make studies to find out whether their methods are giving satisfactory service, whether there are possibilities in the method or system for general application.

Q. When was this system in Columbus installed? It was not new at that time, was it?

A. No, sir, I don't know the date of the installation.

Q. Do you recall from that investigation that toll calls were completed over that Columbus switchboard which were

originated in cities or towns outside of Columbus without going through a toll switchboard?

A. No, I did not.

Q. You did not observe that?

A. I don't know just exactly what you mean, as we in general center calls from the small surrounding places to be handled at the larger toll board. I do not know as I get exactly what you mean by that question.

Q. I mean that people in outlying exchanges, towns near Columbus, could dial into Columbus and get connection with Columbus subscribers through the Columbus exchange?

A. Well, I think there were some calls of that kind being handled. I think there were in some places calls originating in Columbus and going through to surrounding towns.

Q. Newark, for instance?

A. Yes, I think the operator in the Neil House handled [fol. 9380] dialed calls directly into Newark without going into the Columbus toll board.

Q. That is the same thing you have claimed as a development of the A. T. & T. Company and figured some savings on, isn't it?

A. No, I don't think that we have in any case recommended allowing a subscriber to dial through toll calls. I don't know of any when—in fact, it would be rather foolish not to have toll calls handled at some point where they could be ticketed and timed so that we could charge for those calls. I have no knowledge of any method of that kind being recommended or considered seriously. There are the vital objections of not allowing us to get revenue for the use of our toll lines.

Q. This call that you talked about from the Neil House to Newark was handled by an operator, wasn't it? It was not the public, was it?

A. Yes, but it was not handled by an operator under suitable supervision with means of timing the call.

Q. That could have been done in that same connection?

A. I don't think it would be very satisfactory or efficient.

Q. What is the thing you do that is different from what was done then in connection with that kind of a call?

A. Calls going over our toll lines would be definitely handled at some board by an operator who would see that

the subscriber got satisfactory service and that the ticket was properly made out and the call carefully timed so that the subscriber was not improperly charged.

[fol. 9381] Q. Wasn't the user of the telephone in this Neil House call to Newark properly charged? Didn't that call go through the operator there and the operator at Newark?

A. We have not in general found——

Q. Now answer my question. We are talking about this call from the Neil House to Newark.

A. I could not say whether those calls were or were not properly charged.

Q. Did you make such a call yourself?

A. I did not.

Q. Do you know whether or not they were handled through an operator here and at Newark?

A. It was my understanding that they were not.

Q. It was your understanding that the operator in Columbus dialed through to the—I do not mean the operator; I mean the subscriber in Columbus dialed through to Newark without the interposition of any operator at all at either place?

A. No, I do not understand that the subscriber did that. It was my understanding that this operator in the Neil House did such dialing, but I would not term her the subscriber.

Q. The operator at the Neil House did. There was an operator in on that call?

A. Yes, the operator in at the Neil House dialed those calls through and purported to time and charge them, but we would not consider that a satisfactory arrangement for handling them.

Q. Now suppose somebody at Newark wanted to call into Columbus and approached the operator there in the same way; what would you say as to that?

[fol. 9382] A. I haven't any knowledge as to any—my statement in general is that the same conditions would hold in either case, that we would think that the call should be ticketed and timed.

Q. What is to prevent that call from being carefully ticketed and timed; that is what I am trying to get at. Here is the operator making the call and with the opportunity of observing the whole transaction.

A. She is rather an unsupervised employe working here

and there, one individual operator at this point, and I would not consider that a very good way of doing that. We have a much better chance to get careful and accurate work down if we have this work done at some centralized point, as you brought out very carefully yesterday, the provision of supervisors in order to get it more accurate, and more efficient work done on the part of the operator.

Q. Now will you explain to us the difference between this Neil House call that you speak of having observed here in Columbus in 1910 and the single ticket system that you have described in this record?

A. The principal difference between them would be that our single ticket method requires carefully ticketing, supervision of the call, to see that the correct person or number at the terminating end is secured and careful timing of the call at a centralized point where all this work is very carefully supervised, whereas the Neil House proposition left that to one operator who was engaged on miscellaneous work, such as completing local calls, and was very likely to be more or less careless in her timing and possibly on occasions forgetting to make out any tickets on the call, [fol. 9383] so that we had no satisfactory check of the way the traffic was handled.

Q. Now suppose we moved that operator from the Neil House to the central office in Columbus, where the operator would be under all of the supervision that is provided there, wouldn't it be exactly the same thing as you are doing now?

A. Well, instead of handling the work at the Neil House it could have been handled at a centralized point. There would be a considerable difference very likely in the types of equipment, circuits and various parts of apparatus that would be employed; that is, we would provide in the central office an accurate timing device which it would not be really efficient to supply at positions where a small number of calls were handled.

Q. Do you mean to say you have a timing device in all of the offices where you use the single ticket method?

A. Practically all of them. I don't know of any where we have not.

Q. Aren't Columbus and Newark such offices as you would provide timing devices for?

A. Yes. That is one of the differences that I am pointing out that you asked me about between handling the work in

the Neil House and handling the work at the centralized point. I have stated that at the centralized point we would have these accurate timing devices.

Q. Now, leaving out the Neil House and just considering the possibility of calling between Columbus and Newark through the exchange in Columbus or in Newark, isn't that just exactly the same thing you now do and claim credit for [fol. 9384] as the single ticket system in all of its essentials excepting the particular method of accounting that is used in the one case or the other?

A. No, I don't see that the thing has any connection or relation whatever.

Q. Now let's see. What is this single ticket method?

A. Well, that is a definite operating method for use at certain of our toll boards that is covered by a definite set of instructions, several pages.

Q. What are the instructions? How do you do it?

A. It is a matter of probably 40 to 50 pages that I haven't any reason for carrying in mind as they would be——

Q. Is that the best answer you can give to that question? Can't you describe the single ticket method in any other way excepting by reading the 40 or 50 pages of instructions that is embodied in some one of these circulars?

A. Yes, I can describe it but I cannot give you the details of the method.

Q. I asked you to state what it was. Now can't you do that?

A. Just what particular description would you like?

Q. Have you several? I want an accurate description of the single ticket method, any one that occurs to you. If you have several give me No. 1?

A. If you want an accurate description of the single ticket method I think it would be much better if I supply you a copy of the circular covering it.

Q. I am not going to let you supply me with a copy. I want you to tell me now what the single ticket method is?

A. Well, it is a method whereby the calls are routed to [fol. 9385] a recording operator who enters the details necessary for handling that call on a ticket, and that ticket is the only one that is made of the call. The call is—that ticket is routed to the dialing board in the handling office and the operator there secures circuit to the called point, secures the station or desired party at the called point, the

operator in the originating office doing the dealing directly with the person or station called, and if difficulty is met in securing the station or securing the person, definite routines are set up in regard to the times and methods of following up that call and as to what report should be left at the terminating office or station, so that if the called party is secured at a later date the two ends of the call can be readily gotten together and promptly, and then at the time when the called station or person is secured and the calling person is called back to his telephone, then this ticket is used by introducing it in the timing device as an auditor's record of the actual amount of time which is consumed by the parties in their telephone conversation.

Q. Now does that call for the use of any peculiar or particular equipment in order to put through a call of that kind?

A. Yes, the equipment on our boards has been designed so that they facilitate putting through a call of that kind. It could be done on various types of equipment but it can be done much more efficiently on equipment that is properly designed to handle traffic by that method.

Q. Now how does that differ from an ordinary toll call?

A. Well, that is one of the types of the ordinary toll calls. [fol. 9386] Q. Now how does that differ from the type of toll call which you have said it was an improvement upon, and against which you have figured it as a basis for this saving that you have talked about?

A. Well, I would like to state right here that I have made absolutely no reference in my testimony to the single ticket method or to any saving resulting from the single ticket method, so that I do not believe that question applies to anything that I have said.

Q. Do you say that there was no such saving by the adoption of that method?

A. No, I say now that there is a considerable saving by it but I never said anything about it before.

Q. I recall, it was Mr. Anthony that testified about that and not you. Now compare it with the method of calling that you do compare it with in order to say that there is a saving by the adoption of that system and tell us what the difference is between those two classes of toll calls?

A. Well, that is covered entirely in the coefficients which are set up and which have been introduced in testimony as

the previous method was called a two ticket method and comprehended the ticketing of the call at the terminating end and doing certain parts of the work at the terminating office, which it was found by improving transmission on our toll lines and by improving the equipment and by the introduction of this new method we could avoid, and by that reduced the total amount of operators time required to handle this type of a toll call.

[fol. 9387] Q. Isn't this a fact. Mr. Allen, that the only difference between those two types of call that you have been talking about is a difference in the accounting method; that in one case you made out two tickets, that is in the earlier practice, and in the later practice you only made out one?

A. No, there is a difference all the way through. It was a complete different operating method that has been recognized in our coefficients, as I stated, because——

Q. Now coefficients do not——

A. We have to have certain conditions in order to make this second method work. When it was first developed it was only found to apply satisfactorily on direct circuit calls to points giving a certain grade of transmission. With the development in transmission it was found possible to extend that method, and by studying the operating methods it was found possible to extend it to different classes of calls, such as calls originating at pay stations and various calls of that kind that previously it had not been possible to handle by this method; so that it was a gradual development of a complete new method and considerable changes in the switchboard design to make that method work satisfactorily.

Q. Now what are the changes in the switchboard design that are necessary to make it work satisfactorily?

A. Well, improved switchboard cords were introduced and new arrangements of keys on the key-shelf, the introduction of what has been termed busy visual signals; a rather complete overhauling of the layout of the board.

Q. What do you cut out of the previous method of opera-

[fol. 9388] tion by this single ticket system upon which a saving is accomplished?

A. Well we save the work at the terminating end of receiving the details and entering them on the second ticket; we save on the part of the operator at the originating end the time which she consumed in passing these details to the

terminating office. We secured the called subscriber more promptly from the fact that we have obviated this detail work so that we save a considerable amount of circuit time between the two offices which was previously consumed by the work of passing the ticket and things of that kind.

Q. Now, weren't all of the essentials of that operation as you have just described it in this call that we have been talking about between Columbus and Newark that you saw in 1910?

A. No, I see no relation between those in types of calls.

Q. Alright. You have not applied your coefficients to that call between Columbus and Newark; I think that is the principal difference.

A. No, I do not believe we would apply it to that call there, Mr. McConnaughey.

Q. Mr. Allen, you have introduced here some photographs of switchboards, Nos. 1 and 2; is 3 a photograph of the switchboard also?

A. I think it was. I think it was a photograph of a switchboard with the operators actually seated.

Q. Oh, yes, that is right. Now those are modern, up-to-date switchboards, as I understand it. That is, of recent date—those pictures?

A. Yes those are a type of board which are in common use, but are not in general use. There are many other types [fol. 9389] of boards. Even in certain offices in multi-office cities there are other types of boards; those are simply types; not by any means the only types of boards which we use.

Q. Now couldn't a photograph showing substantially the same things have been taken in a Bell telephone office as much as 20 years ago?

A. Photographs could have been taken in Bell offices but they would not have shown many of the things that are shown on those boards.

Q. What would they not have shown if they had been taken 20 years ago?

A. There have been considerable changes and improvements during that period.

Q. I am talking now about—my question includes substantially the same?

A. Exhibit No. 2, which I showed you, which you have just discussed very thoroughly here, showed mechanically

locking keys on the B board which made machine ringing possible on B boards which is one of the very important elements in securing operating savings.

Q. Does the photograph show that? Can you see that on the photograph?

A. That one thing would make a board entirely different from the board as it was 20 years ago.

Q. Can you tell from that photograph No. 2 that it is equipped with the machine switching?

A. You mean machine ringing?

Q. Yes.

A. I think any one who had any familiarity with telephone engineering could distinguish that, Mr. McConnaughey.

[fol. 9390] Q. Can you point out the distinguishing features?

A. Here are the rows of mechanically locking keys very prominently shown on the key shelf.

Q. Are these the things right here?

A. Yes, sir.

Q. Any other features that would be different?

A. Oh, many of the features are not shown in detail enough so that I could point them out specifically. The cords on these boards are of course of the improved tinsel cord type.

Q. That don't appear in the picture. I just want you to tell the general characteristics of these exchanges as compared with one 20 years ago, as they appear in a picture?

A. Well, a picture naturally would not show whether a cord was steel or tinsel and these exhibits were put in entirely in order to give a general description of how calls are handled and were not put in with any statement that they showed features——

Q. That is understood. You might answer my simple question and we would save a lot of time. Would'nt a picture of an exchange 20 years ago look substantially like that in its general characteristics? Answer it yes or no?

A. No.

Q. Now how would it differ?

A. It would only look the same in that it has somewhat the same general appearance of an upright board with a key shelf but the details of the board have been largely changed; that is on the face of the board; all of the ar-

rangements for marking the multiple and facilitating the work of the operator has all been thoroughly studied and [fol. 9391] changed and the board in general has been changed and there have been very few items that have not been improved although the switchboard in general has the same upright appearance with a key shelf, but the details have all been changed.

And thereupon a recess was had until 1:30 o'clock P. M. of same day, Tuesday, May 13th, 1924.

[fol. 9392] Afternoon Session

Tuesday, May 13th, 1924.

And also ARCHIBALD J. ALLEN, resuming the stand for further cross-examination, continued his testimony as follows:

Cross-examined by Mr. McConnaughey:

Q. Mr. Allen, on page 453 of your testimony, in your answer on that page you refer to the service which is given to the public through an improvement in the multicount prepayment box; should that be multi-coin?

A. Yes, that should be multi coin.

Q. When was that multi-coin prepayment box put in service? Will you give us the date on that?

A. I don't think I did give any date; I think the original boxes were put in in about 1909.

Q. About 1909? Now were those the multi-coin boxes?

A. Multi-coin prepayment boxes.

Q. In 1909?

A. Yes, sir.

Q. They have been in use ever since that time?

A. They were installed in Brooklyn at that time, about 100 of them, for experimental use and they proved successful and they have from time to time been extended as to use since that time.

Q. Wasn't there a nickel prepayment box in use for several years prior to that time?

[fol. 9393] A. There was. I think it was a No. 7 coin box that had a single slot.

Q. Just for nickels?

A. Yes, sir, just for nickels.

Q. But that was not used generally, was it?

A. It was not of general use at public stations because it was rather difficult, too difficult for toll calls and calls of that kind, which are a considerable percentage of the calls placed at a public station. It would be rather impossible to collect the larger charges all in nickels. It would take a great deal of time on the part of the operator and annoyance on the part of the subscriber and we did not use them for that purpose.

Q. Isn't it a fact that the great proportion of the calls over those boxes are the nickel calls?

A. Well, there are a very large number of toll calls placed at those boxes.

Q. Answer the question. Isn't it a fact that the largest part of the calls coming in over prepayment boxes are nickel calls?

A. Yes, I would say the largest part would be local calls.

Q. That prepayment feature could have been just as well applied much more generally than it was to the advantage of the service, could it not?

A. No, I think not. I think the box would not have been suitable for that purpose.

Q. On page 480 you were referring to records of the amount of traffic and the system of reports and instructions with reference to records of that character, local and toll [fol. 9394] peg count instructions, methods and forms for use in maintaining records. Let me ask you to what extent reports were made to the General Staff of traffic results by the Associated Companies?

A. You say was—You mean are?

Q. Are, I will say?

A. The Associated Companies send us a blueprint copy of the records, summary records as outlined in that exhibit, for practically all of the offices in the various Associated Companies.

Q. Are they complete reports of all traffic?

A. They are the complete summary forms, that is the forms are made up entirely for use in administering the work in the Associated Companies, and an additional duplicate copy is made of the same summary and forwarded to us in New York.

Q. Now, Mr. Anthony testified, I think, in some one of these cases, that it was the practice in Ohio to take peg

counts two days of each month and then at some other special days scattered along through to get representative conditions. Now those reports are all sent in—copies of them—to the General Staff, are they?

A. Well, the Associated Companies many times will take special records for various purposes. The routine counts that are kept each month and which they summarize for their own purposes, we receive a blueprint copy of those.

Q. But any count they have made for some special purpose in some particular exchange you would not expect to receive that unless it was a matter in which you were making some studies?

A. Yes, or a matter in which they wanted to consult us, [fol. 9395] they would send us those.

Q. But the routine reports they do send you regularly?

A. They send us a blueprint copy of such study.

Q. Now, on page 484, you speak of the difficulty of forecasting the amount of business which you are going to do at a certain time; "I use the illustration if we were manufacturing brooms we would decide we were going to manufacture a certain number of brooms in one month, but we can not decide how many telephone calls we will handle. We have to handle the telephone calls that are given to us so that these conditions make the problem or proposition of telephone managing a very complicated one". Is it an accurate statement to say that you decide upon your equipment with a certain assumed maximum capacity for handling the traffic?

A. No, I would say that we decide on it with a certain assumed average condition and we have made studies that would lead us to know how much the possible maximum might be above that, whether it would be a point where we might have to take some special action in providing equipment, that is, we would provide equipment possibly for the average condition of the busy season; we would not take some one busy day or busy week, but the average condition, so that there would be sufficient equipment to handle the average of the busy season.

Q. Figuring that way you expect sometimes to run into a situation where you do not have the operating force or the equipment to quite meet the demand, I assume?

A. Yes. But in general there is enough elasticity in the

[fol. 9396] force and equipment to carry those cases. It would not be economical to provide equipment to take care of extreme peaks.

Q. Now if you should be provided with machine switching equipment you could meet all of those peaks to the limit of the equipment and the question of the operating force would not cut any figure at all in meeting unexpected peaks, would it?

A. The equipment would assume the major portion of the problem in a machine switching office.

Q. The mechanism being just as capable of handling the extremes of traffic or the traffic that was presented at one time as at another?

A. No, you would have exactly the same problem in providing equipment for a machine switching office as to find equipment to handle the average maximum.

Q. With the difference that you would not have to figure on an operating force to the same extent?

A. Absolutely.

Q. Now you refer to the No. 1 C board, which seems to have some particular elements; what are those?

A. The No. 1 C board has the automatic listening, audible ringing signal; on the A cords machine ringing; I think that is about all.

Q. Multiple answering jacks?

A. Multiple answering jacks are not a necessity in No. 1 C; we put those in in particular types of boards where they prove in, but they are not an integral part of it.

Q. Not an essential feature of the 1 C, but they can be [fol. 9397] put in on the 1 C?

A. Yes.

Q. Now what are the characteristics of the No. 1 D board you have referred to?

A. The No. 1 D is a board that is made up to take care of offices that are of a smaller size than the ones where we would provide a No. 1 C board, having largely the same features, but in some cases a cheaper arrangement of equipment, as the equipment is not asked to do quite as many things as in the case of No. 1 C.

Q. What are those things that these 1 D boards are not required to do?

A. I am not an equipment engineer and I would not be able to give you definite conditions in connection with the circuits on any of these boards.

Q. What sort of exchanges are the 1 D boards used in?

A. In offices where the ultimate capacity or ultimate number of lines that are expected during the life of the board—I don't know whether it is 2000 or 3000—some rather small number of lines.

Q. Going back to these reports that are made of traffic results that you were talking about a moment ago, what does the General Staff do with reports that come to them in that way?

A. We make certain summaries of those, certain comparisons of the results that are being obtained in comparable offices throughout the system, and in case of any reports that indicate that something should be done differently we would advise the company and offer to suggest the things that might be done, and oftentimes might result in our going out and assisting the company in improving the results in that given city.

[fol. 9398] Q. That is, if the results do not come up to the standards that the General Staff things they should come up — you make suggestions that will bring them up to the standard, is that right?

A. I would not use that word standard in connection with it because it is rather difficult to say there are definite standards on this. If there are any elements in connection with the summaries that we think would be of assistance to the Associated Companies and we can assist them in any way, we would write to them and suggest any changes we might think proper.

Q. And you, through these reports, aim to keep track of the efficiency of the operation in the companies?

A. We are largely interested in seeing how well the routines which we provide to the companies are working out, whether they are working efficiently, and a study of these reports for that time leads to our seeing where we think some improvement might be made, and in all such cases we supply the company with that information.

Q. Can you tell us the relative amount of the toll business that accrues from public pay stations?

A. That varies a great deal from one city to another. I should say possibly around eight per cent, which might be a good average for the toll business originating in that way.

Q. About eight per cent comes from public pay stations?

A. It varies a great deal from city to city.

Q. And the remainder of the toll business comes from local subscribers' stations, does it?

A. Yes.

Q. Now, quite a number, or a great deal of work of the [fol. 9399] General Staff in the traffic department that you have testified about has to do with toll line properties, doesn't it?

A. Yes, we have a considerable amount of work in connection with toll problems.

Q. And the purpose of that is to establish greater efficiency and economy in the operation of the toll lines of the Associated Companies as well as the toll business of the A. T. & T. Company which is conducted in the local exchange?

A. The work is for all of the toll business, to get more efficient and better toll service, both handled by the Associated Companies and handled by our own Long Lines Department.

Q. And the toll information that goes out to the local companies is of benefit to the A. T. & T. Company in its Long Lines business through its effect on the local exchange board of the toll business, isn't it?

A. Well, it is of advantage to the Long Lines Company in handling the business which it handles.

Q. And also to the Long Lines Company in the superior method in which the local business—the local Associated Companies handle the toll business in the local exchanges, isn't it?

A. Yes, any improvements we find that can be made on the toll switching work, work of that kind is of assistance to the Long Lines on the calls which they handle.

Q. Yes, certainly.

A. Yes.

Mr. McConnaughey: I think that is all, Mr. Allen.

[fol. 9400] Cross-examination.

By Mr. Shuler:

Q. How many general officers are there of the A. T. & T. Company?

A. I only know of the general office——

Q. General officers?

A. I haven't any data that would answer that question.

Q. How many general officers of the A. T. & T. Company are connected with the General Staff?

A. Well, I have in mind a figure, that there are about 1800 people on the General Staff.

Q. Officers?

A. I have no data as to just how many officers there are or just what is meant by officers.

Q. Do you know what the operators wages were in 1923 of the Long Lines Department?

A. No, I do not.

Q. The Long Lines Department do maintain a corps of men superintending the construction and repair of the Long Lines?

A. Yes, they have such a force.

Q. Do you have any idea how many — on that force?

A. No, I have not. That is not in my department.

Q. Do you know what they spent for traffic superintendence of the Long Lines department in 1923?

A. No, I have not. I would not have any details of that.

Q. Would you think it would be as much as $1,300,000.00?

A. I would not have any data.

Q. You are in the traffic department, aren't you?

A. I am in the general traffic, the general engineering [fol. 9401] department.

Q. Haven't you any idea how much you spent for traffic superintendence?

A. Not in the individual companies.

Q. No, I mean the Long Lines?

A. No, I haven't the details; I haven't in mind the details of the traffic expense of the Long Lines Department.

Q. Do you think $1,300,000.00 is too much?

A. I would not have any opinion on that.

Q. Does the Long Lines Department operate a school for telephone operators?

A. They have several schools for telephone operators in the large cities where they operate an office. If the force is large enough so that it is economical to give them their preliminary training in a school they operate such a school, in New York and Chicago and some of those large offices.

Q. Do they have a service inspection department?

A. They do.

Q. Do they have central offices?

A. Yes, sir.

Q. All over the country, do they not?

A. I mentioned this afternoon a dozen or fifteen of those offices.

Q. Do you think that $6,125,000.00 would be too much or too little for operators wages for the Long Lines Department? Well, I will state it this way. The annual report shows that $6,125,375.77 were operators wages paid in the year 1923?

A. I think that is correct.

Q. Are the central office equipment repairs a considerable sum of money, would you think?

[fol. 9402] A. That is entirely outside of my work, so that——

Q. That has nothing to do with the—what did you say?

A. My opinion on that would not be at all helpful because it is entirely outside of the work I have any connection with.

Q. There would be, in your opinion, considerable repairs to central office equipment, don't you think?

A. Yes, sir, they would have a maintenance account that would amount to considerable.

Q. They have quite a large number of operating officials and assistants, do they not, in the Long Lines Department?

A. Yes, they have—they are set up very similar to an associated company and have traffic superintendens, plant superintendents, commercial superintendents with assistants.

Q. They also have service inspectors, do they not, the Long Lines Department?

A. I do not think we have any such term in the service; I think possibly what you mean is service observers.

Q. I am simply using the term as used in the annual report?

A. Yes, that is it.

Q. Service inspectors; they also have supervising foremen, do they not?

A. I think so.

Q. Do they have any men engaged in central office installation and maintenance men?

A. Well, this is entirely outside of anything that I have any personal knowledge of. I am willing to assume that if they have central office, as I know they do, that they have central office maintenance men, but it is nothing that I am familiar with.

[fol. 9403] Q. You would not be surprised if they had line and station construction installation and maintenance men, would you?

Mr. Burr: Suppose he would be surprised?

Q. Do you think that they have? Let us put it that way?

A. I am willing to assume that they have maintenance men out maintaining their pole lines, yes.

Q. They also have a large number of clerical employes to take care of the Long Lines business, do they not?

A. Yes, they have a clerical force.

Q. And they have a large number of operating officials for the Long Lines Department, do they not?

A. Yes, sir; they are set up very similar to an Associated Company. I think you will find that they have most all of the same officials that an Associated Company has.

Mr. Shuler: I think that is all.

Redirect examination.

By Mr. Burr:

Q. Is the schedule referred to this morning by you, Mr. Allen, in your cross-examination, a schedule which you recommend for general use for telephone exchanges in Ohio?

A. No, the schedule which I submitted in Exhibits 12 and 13 was submitted merely to show the difference in the number of people that would be required to provide a schedule where we attempted to follow the traffic hour by hour, and the number of people that would be required [fol. 9404] in a schedule where we assumed we would use the same people throughout the business day. I submitted those two schedules because they showed that fact and because they happened to show a greater excess on the schedule where we attempted to follow the traffic; so that my results would be more than fair to the proposed method of toll schedule with the same number of people throughout the day. I would not submit that as a schedule that we would recommend to actual use in an office of that nature.

Q. Do they represent schedules or are they schedules which are typical of representative conditions in Ohio?

A. No, I know of no offices in Ohio where that would be a schedule used.

Q. Have you prepared a schedule on any different basis than the ones just referred to?

A. Yes, I did prepare a schedule for that same office which would be the schedule which we would recommend to use under the conditions in that office with exactly the same requirements as were shown on the previous schedule.

Mr. Burr: The schedule may be marked for Identification Allen Exhibit No. 14.

And thereupon the Paper Writing above referred to was marked for purposes of identification as Allen Exhibit No. 14 and was admitted in evidence on behalf of The Ohio Bell Telephone Company and is herewith submitted and marked Allen Exhibit No. 14 and made a part hereof.

[fol. 9405] Q. In what respect does Allen Exhibit No. 14 differ from the schedules which you were discussing this morning?

A. In order to overcome the difficulties in drawing a schedule to fit that particular office which I originally submitted as being a curve from which it was fairly difficult to draw a schedule, we have provided a half hour lunch period for the operators who work straight day tricks. This makes it possible to get out the lunches without having very many excess operators at the beginning and ending of the actual day's work.

I might add right here that a reasonable amount of excess in a schedule is not considered unwise as we have in our forces many new girls, and if we have occasionally two or three operators for a couple of hours in excess of the actual requirements that time can be very well used in giving those newer girls more special coaching in order to improve the service.

Q. Is your schedule marked Allen Exhibit No. 14 a more efficient one than Allen Exhibit No. 12 referred to this morning?

A. Yes, I should say that it is because we have taken advantage of the arrangement which reduces the excess force.

Q. As between the two kinds of schedules which would you recommend for the load curve referred to in your evidence?

A. I would recommend the schedule as in Exhibit 14,

which is typical of the schedules that are in use in offices from where that load curve was taken.

Q. If outside plant conditions are such that residence and [fol. 9406] business lines may combine or mix in one board, is it or is it not good practice to so combine or mix them?

A. From the standpoint of drawing a schedule it generally results in a possibility of drawing a better schedule where we have those two classes of service mixed.

Q. In what respect does the combination of the two render the operating more efficient?

A. It makes the peaks less pronounced. That is, we get peaks in different hours in business and in residence and by combining these we smooth out to some extent those peaks.

Q. Is it or is it not possible or practicable to compare the 153 calls per operator referred to by Mr. McConnaughey this morning with the 53 calls per operator also referred to by him, without knowing whether the calls are pay station, flat rate, measured service, trunked calls or of whatever particular kind or class they actually are?

A. It would be unfair to make a comparison without taking all of those elements into consideration.

Q. Is the City of LaCrosse a multi-office city?

A. It is not. It is a single office city.

Q. Is Dayton?

A. My understanding is that Dayton is a multi-office city, three offices.

Q. Is Columbus?

A. Columbus is a multi-office city.

Q. Cleveland?

A. Multi-office city.

Q. Toledo?

A. Toledo is a multi-office city.

Q. How many Bell stations are there, if you know, in the Columbus Exchange area?

A. It is my understanding that there are about 41,000. [fol. 9407] Q. How many automatic stations are there in the Columbus area?

A. About 19,000.

Q. Was the Dayton State plant, at the time of the consolidation of The Ohio State Telephone Company and The Ohio Bell Telephone Company, equipped with automatic telephones?

A. It is my understanding that it was equipped with an automatic system very similar to the one in Columbus.

Q. Tell the Commission whether or not all long distance calls—by that I mean Bell System long distance calls in Ohio, are ticketed by a toll operator and not an operator at some subscriber's P. B. X.?

A. That is true. We have a small amount of traffic that is completed to stations in towns within a very few miles which we call AB toll traffic in which there is a toll charge, but that is traffic on which there is no privilege of a particular person and where the ticketing is a very simple matter. Aside from that all of the calls are handled at a designated toll board.

Q. Now when you referred this morning to an operator in the Neil House at Columbus, did you mean the operator at the small switchboard in the lobby of that hotel?

A. That was the operator who, according to my understanding, was handling calls to Newark.

Q. Was it your understanding that the same operator handled local calls; that is to say, those from persons in the hotel to persons outside of the hotel in the City of Columbus and vice versa?

A. It was this same girl.

[fol. 9408] Q. Was it your understanding also that she handles calls which were local entirely to the hotel; that is to say, as between one room or one department and another room or department within the hotel?

A. No, it was not. I think they had a separate exchange operator who handled that.

Q. Did you have reference to the board to which the general public in the lobby of the hotel had access?

A. That was the condition.

Q. Compare those conditions, if you please, to the toll operator whom you say tickets every toll call in the Bell System?

A. Well, in that case we have a team of operators who are specially trained in handling those toll calls and are carefully supervised, and in addition to that reasonable checks made so that we know the calls are properly ticketed and timed.

Q. What about interference and interruptions and distractions caused by others in the room where these operators are comparable with the same distractions and interruptions that are encountered in a hotel lobby?

A. Well, things are kept in a very orderly business like manner in the telephone office, and it is impossible to keep things in that same condition ordinarily where the operator has to deal with rushes of patrons or people who merely want to talk and pass the time of day. The comparison would be such that the operator in the hotel, I should think, would have great difficulty in giving proper attention to toll calls.

Mr. Burr: That is all.

[fol. 9409] Recross-examination.

By Mr. McConnaughey:

Q. Did you understand that the only place that call could be put through from Columbus to Newark was at the Neil House station?

A. No; there may have been others. I knew of that particular case. I wouldn't say that there were not any other places.

Q. If a call had been made in that way to Newark at the exchange of the Telephone Company through the toll board, through the operator at the toll board at the exchange, there is no reason why these distractions that you speak of should cut any figure in the matter at all?

A. No, if the call was handled at the toll board that would obviate those things.

Q. Certainly, and if the call was made from Newark at the exchange into Columbus the same thing would be true; that is correct, isn't it?

A. If it were handled at the toll board, yes.

Q. Didn't you know as a matter of fact that it was handled through the toll board at Columbus although the original call was put in at the Neil House?

A. No, that was not my understanding.

Q. What was your understanding?

A. That the call went directly from the operator in the Neil House directly to Newark, without being handled by the operator in the toll room.

Q. Suppose it was originated at any of the subscribers [fol. 9410] other than the Neil House, any place, how would that sort of a connection be made; how was it made?

A. My understanding was that those calls from subscribers stations to a near-by town were handled at the Columbus tollboard.

Q. At the Columbus tollboard?

A. Yes, sir.

Q. And the operator at the Columbus tollboard would make a record and have charge of the call, wouldn't she?

A. Yes, sir.

Q. And if she called automatically in from Newark it would be in effect the single ticket call, would it not?

A. If she only made one ticket out of it it would be a single ticket call.

Q. And it would accomplish the same purpose and do exactly the same thing as this thing we were talking about this morning, this single ticket call developed by the A. T. & T. Company?

A. Well, the ultimate object is to get the connection made and properly charged.

Q. And it would accomplish that thing practically the same way, would it not?

A. If it worked satisfactorily.

Q. Any kind of a toll call is supervised under your system, isn't it?

A. All of the calls which we handle are given supervision.

Q. Yes, certainly. The calls that were made before the single ticket system was devised and which it took the place of—which that system took the place of, as well as the single ticket calls, were supervised, were they not?

A. Yes.

[fol. 9411] Q. And supervision is not any essential feature of this single ticket call proposition?

A. No, I was merely comparing the conditions of the operator in the Neil House. No, my impression—in fact, my knowledge of the Columbus tollboard where we did some work at that time was that they had copied our single ticket method and were attempting to use it to the best advantage they could in the Columbus board at that time.

Q. When did you put that into effect?

A. We started experimenting with the single ticket method about 1907 and applied it a short time after that to certain types of calls and through certain types of circuits, and since that time we have developed it, and, as I stated, this method can be used on still different types of calls.

Q. When did you complete that development to the point where you say it effects the savings that you testified to?

A. I think the last work which made it possible to handle that on certain classes of calls was 1921.

Q. 1921?

A. Yes.

Q. You were 14 years developing that?

A. We developed it and put it in use as the development of the art made it advisable to do so. We found, as I said this morning, that it requires a certain grade of transmission over the toll lines and we found that under certain conditions of management it was possible to extend that to apply to collect calls. The application of the single ticket method to the collect calls was about the last development. That is the one I had in mind that was made in 1921.

[fol. 9412] Q. What do you mean by a collect call?

A. A call in which the party putting in the call requests that the charge be made to the person called or the station called rather than to the originating party.

Q. What additional machinery or what additional feature does that require in the system?

A. It requires a definite set-up so that those tickets will be properly made out and carried through to the auditing department, so that the party being called is charged with those calls.

Q. That has nothing to do with the actual making of the call, however?

A. The subscriber who makes the call is not in any way asked any different questions.

Q. It is just a question of what is done with the ticket after the call is completed, isn't it?

A. It is a matter of setting up a proper routine so that those calls are properly handled.

Q. That was the result of the 14 years of development?

A. No, that was the last development which made it possible to handle practically all of the calls and avoid—simplify the training of operators so that they could handle a certain number of calls with less labor.

Q. Tell us to what calls that system is applied at the present time, what class of calls?

A. Well, we use it on all of the fairly long-haul toll traffic; where we have certain traffic to nearby towns we have developed a method which is known as the two number method, and which makes a still further saving in operators time, and the single ticket method is in general use in traffic to points possibly not over 30 miles apart.

[fol. 9413] Q. But all toll lines where it is more than 30 miles apart, that would be a different situation?

A. We consider all of the conditions surrounding those things. But in general it is used on the large bulk of telephone calls.

Q. Where you do not use that system what do you use?

A. You might use the system I first mentioned, the two number.

Q. That would be for short haul calls?

A. All of the rest of them——

Q. Not the single ticket method?

A. We have some where we use what is known as the dispatch method of handling those calls which gives a still higher grade of efficiency than can be given by the other.

Q. What is the dispatch method?

A. That is a method which has been developed in the past few years whereby we use special equipment on a circuit for passing certain orders and after a certain number of orders have passed we use the circuit then for completion, thereby giving a higher percentage of the team time of the circuit.

Q. What do you do with your tickets in your dispatch method?

A. We use them to bill the subscriber.

Q. I know, but do you have a single or a double ticket there?

A. I think there is some skeleton ticket made. I could not give you the details of the dispatch method.

Q. What was the purpose of the production of your Exhibit 12?

A. I introduced Exhibits 12 and 13 to show the difference in the number of operators which would be required to operate this office if we arranged to cut down the force during [fol. 9414] the afternoon hours as much as we could to meet the falling off in traffic as compared with a schedule where we used the same number of operators through the business day with the exception of the lunch period.

Q. That is what I understood. Now what is this Exhibit 14?

A. Exhibit 14 is a schedule that I prepared to show just about the actual schedule that we would advise putting into an office having the particular traffic curve——

Q. Wasn't——

Mr. Burr: Having the particular traffic curve of what?

The Witness: That was introduced as an exhibit of the business office.

Q. Wasn't Exhibit 12 supposed to do that same thing?

A. No. Exhibit 12, as I stated both at the time that I entered it as an exhibit and have stated it repeatedly here under cross-examination, was introduced solely for the purpose of showing the comparison between those two types of schedules and was introduced because I previously stated it showed a larger excess in the schedule so that it could not possibly be considered as anything except referring to that method of drawing a schedule.

Mr. Burr: Hadn't it reference to Mr. Shuler's method?

The Witness: Entirely, and that is what I stated at the time I introduced the exhibit.

[fol. 9415] Q. You also stated that that Exhibit 12 was an exhibit of an actual exchange in operation, didn't you?

A. I stated that the exhibit curve—I don't know the number of the exhibit——

Q. 9?

A. Was a curve showing the variation in the traffic in an actual office.

Q. Didn't you also make the other statement I have just quoted, that Exhibit 12 was also an actual exhibit of the schedule which had been prepared for that office?

A. It was a schedule which I had brought to introduce along with Exhibits 12 and 13 to show the condition in the number of operators required if we build a schedule cutting down the number of operators when the traffic came down as compared with carrying the same number of operators throughout the day and it was introduced for no other purpose.

Q. This is for the same purpose, is it not?

A. No, this is a schedule which we would recommend as a reasonable schedule to use in this office.

Q. And wouldn't you recommend the schedule that you introduced as Exhibit 12? That was a schedule which you prepared with reference to the curve you had before you?

A. For the purpose of comparison with the schedule where we used the same number of operators during the day.

Q. Now your explanation would be that Exhibit 12 was

better than Exhibit 13, is that it, but not as good as it ought to be?

A. That Exhibit 12 showed that by following the curve of traffic and reducing the force during the hours of the business day when we received less traffic we could operate [fol. 9416] with less people than though we assumed we would use the same number of people throughout the operating day.

Q. This is based on that same curve, Exhibit 14?

A. Exhibit 14 is based upon the same requirements but is drawn to fit the condition which we would recommend in this office.

Q. You figured it a little closer, is that it?

A. No, I figured it at an entirely different basis. I figured this as an exhibit of an actual schedule which it would be proper to use.

Q. Then you were kidding us yesterday, weren't you?

A. I hope not. If so, it was entirely unintentional.

Q. I understood you to produce that exhibit yesterday for the very purpose you now say you produce this one for; when did you prepare that exhibit?

A. I stated repeatedly to the contrary. Those schedules were prepared at that time and I introduced them for comparative purposes.

Q. Have you some more schedules there to introduce?

A. I have some more schedules. I haven't any to introduce.

Q. Have you any more schedules? Let us see them.

A. What?

Q. Based upon those same requirements?

A. Yes, I have one other schedule based on those same requirements.

Q. You were asked to produce one based on a residence office. Did you prepare it?

A. I have one here if you would like it.

[fol. 9417] Mr. Burr: It may be marked Allen Exhibit No. 15.

And thereupon the Paper Writing above referred to was marked for purposes of identification as Allen Exhibit No. 15 and was offered and admitted in evidence on behalf of The Ohio Bell Telephone Company and is herewith submitted and made part hereof.

The Witness: This exhibit is for the same typical business office prepared according to the earlier method but with the half hour lunch so that it could be compared directly with Exhibit No. 14.

Mr. Burr: This is not one you would recommend?

The Witness: No, I would not recommend it.

Mr. McConnaughey: This is a residence schedule prepared according to Mr. Shuler's suggestion?

The Witness: No; read my answer.

(Answer read.)

By Mr. McConnaughey:

Q. Have you one there for a residence office?

A. I have a study for the typical residence office for which the curve has previously been produced.

Q. Now is this the one that you recommend?

A. Yes, this is a schedule which could be applied in the office having that particular traffic.

Mr. Burr: It may be marked Exhibit 16, Allen Exhibit 16.

And thereupon the Paper Writing above referred to was [fol. 9418] marked for purposes of identification as Allen Exhibit No. 16 and was offered and admitted in evidence on behalf of The Ohio Bell Telephone Company and is herewith submitted and made part hereof.

Q. Is this your final recommendation, that is what I want to know?

A. This is a schedule which could be used——

Mr. Gentsch: Can't you answer the question yes or no without a big long speech every time?

Mr. Burr: This witness is doing very well, Mr. Gentsch.

Mr. Gentsch: I submit to the Commission that this witness has not answered a single question yes or no that could be answered that way. Every time it is a speech. It is never yes or no.

Mr. Burr: You don't know enough about the telephone business to know whether it could be or not.

Mr. Gentsch: I know enough about it to know whether a question can be answered yes or no. I submit that the witness ought to be instructed to answer questions yes or no when they are susceptible of that kind of an answer.

Commissioner Maullar: If this answer is responsive to the question, that is all that is required.

Mr. Gentsch: It is not responsive.

(Question and answer read.)

The Witness: I have not been asked to make any final recommendations. I was asked by counsel to produce requirements, operator requirements for this office, and I [fol. 9419] have tried my very best to comply with that request and I would say that this schedule I would be glad to finally recommend, or recommend it in any way that you would like to have me.

Q. You were also asked at the same time you were asked for this schedule to produce a business office schedule in exactly the same language and for exactly the same purpose, and you have produced two schedules. Now have you produced two of these residential schedules?

A. I beg leave to correct that. I have at no time been asked by any one in connection with counsel to produce any schedule. I was asked if I would show at my return the operator requirements for this business curve and the operator requirements for the residence curve, and I have produced that, and on every one of these schedules which I have submitted, on the line "Operator requirements" are exactly the same figures on every schedule I have introduced. That is all I was asked to introduce, and the others, the actual tricks, were introduced for an entirely different purpose and not at any request of counsel.

Q. Then on your residence schedule, you have only one schedule, have you?

A. I have just introduced the residence schedule that you have before you.

Q. Have you any other residence schedule that fits these requirements?

A. No, I haven't any other residence schedule that fits those requirements.

Q. Alright. Now you say it is not fair to compare the 50 calls in the non-busy hours with the 153 in the busy hours [fol. 9420] because of lack of knowledge as to the class of calls. Have you made any assumption or had any data with reference to the class of calls in preparing any of these schedules?

A. Yes, these schedules were prepared from the actual units during the different periods of the day.

Q. On an actual day?

A. On actual units.

Q. Was it on an actual day's business? That is what I am trying to get at?

A. No, ordinarily we would have the average of several days in a curve of that kind, not on any actual business.

Q. And this is based on the average of seven days is it? Is it actual experience or is it purely theoretical.

A. No, it is the actual results.

Q. That is what I understood. So that all of the elements that you have mentioned of the different classes of calls that might effect this comparison are considered in these figures?

A. Yes; the only point I wanted to make clear was this, you could not go back to the curve and assume that those were units on that curve. Those are calls and would have to be reduced to units before you could build a schedule.

Q. Because of these differences in the character of the calls?

A. Yes, sir.

Q. But that was all taken into consideration in your study, wasn't it?

Mr. Burr: Which study?

Mr. McConnaughey: The study which produced these exhibits, if there was one.

[fol. 9421] The Witness: I do not call that a study. The actual units for each half hour were derived and on the basis of those units the schedule was drawn. That is something that was done as a routine in all of these exhibits where the schedules were built.

Q. And each half hour's calls noted, the number of trunked calls and the number of toll calls and the number of different classes of calls which would make any difference in the calculation?

A. Those all have to be taken into consideration.

Q. They were all noted as a basis of this schedule, were they?

A. Yes.

Q. Now let us have the report of the number of calls that entered into this preparation, into the preparation of this schedule?

A. I haven't any such data. I was not asked for any data of that kind and did not know of any reason why it would be useful. So I haven't any such data.

Q. You did not produce it?

A. No; we talked this all over this morning and I suggested you get such data from the Ohio Company if you would like it.

[fol. 9422] And also W. T. ANTHONY, recalled for purposes of cross-examination, continued his testimony as follows:

Cross-examined by Mr. Dotson.

Mr. Burr: Before the cross-examination of Mr. Anthony commences I should like to ask him whether or not he has prepared and has with him the information requested by Mr. Dotson?

The Witness: Yes, I have such information. I have a list of questions which Mr. Dotson submitted. I can read those and give the answers if that is satisfactory.

Mr. Dotson: It will be satisfactory and it will save me propounding them again if you will do that, Mr. Anthony.

The Witness: The first question is:

"On what data are the Anthony Exhibits based?"

The Anthony Exhibits are based upon actual records of the Company for the year 1923. I have in mind my exhibits on savings.

Question. We would like to have a detailed outline of the design of the local training switchboard for both A and B.

Answer. The design of local training school switchboards is covered in detail in Traffic Circular No. 133, which I placed in evidence during my direct examination. The B Board equipment required for that training is also [fol. 9423] covered in the same circular.

By Mr. Dotson:

Q. You do not remember the exhibit number?

A. Yes, Anthony Exhibit No. 1.

Question. Why should they differ as between cities?

Answer. The provision of local training school equipment will differ as between various cities due to different classes of service, to a difference in the losses from the operating forces, the net growth in the operating force; the requirements will vary according to the size of the exchange, the

number of offices in the exchange area, and the location of the training school equipment has a bearing on the arrangement of the equipment.

Q. Speaking now of the location of the training school, do you mean the location as related to the location of the exchange?

A. No, I have in mind, Mr. Dotson, that the layout of your school depends to a large extent on the floor space available for the school. We do not always have the same amount of space or the same division of space between offices.

Q. These schools are located and conducted in connection with the local exchange, are they not?

A. That is right, yes, sir.

Q. Do you mean, for instance, in a locality like Toledo where there are branch exchanges, the school is connected with the main exchange or with some branch exchange?

A. In the case of Toledo all of our operators are trained in the schho- located in the same building as the Main Exchange in the Spitzer Building.

[fol. 9424] Question. We want to know wherein this equipment would differ, for instance in Toledo from that in Columbus or Youngstown or Dayton.

Answer. I think my answer to the previous question would answer that question.

Q. You mean then you adopt your previous answer as an answer to this question?

A. Yes, sir.

Question. In what way does the toll fundamental plans or plan effect the traffic conditions?

Answer. Results of the toll fundamental plan provide the traffic department with information on the following points:

a. The economical number of toll centers in the territory.

b. The particular exchanges that it is economical to operate as toll centers.

c. The economical assignment of tributary offices.

By tributary offices I mean an office that does not operate its own toll. It is economical to keep the number of exchanges handling toll traffic at a minimum and we find it economical to serve as high as 15 or 20 or 25 small exchanges from a large exchange. The subscriber in the smaller ex-

change will place his call and that call is transmitted to what we call the toll center, where a toll operator writes the ticket, times and supervises the call.

Q. About how large are those exchanges that are handled that way?

A. Well, there is no general rule, Mr. Dotson; it is a matter of cost. Also a question of the amount of toll traffic [fol. 9425] a given exchange may originate; also a question of the location of that exchange. A small exchange may be from a circuit standpoint a good point for switching traffic, in which case we would probably make it a toll center, whereas if it were not a good switching point we might make it a tributary of a larger office in that vicinity.

d. The economical toll operating method that should be made effective between various points, that is, in connection with our toll fundamental plans, would develop information as to whether we should have cable or open wire between two exchanges, and there is some difference in the cost of construction there and if the construction can be gotten cheap enough we will introduce what we know as a short haul toll method, AB toll, which gives the public a non-delayed toll service. They remain at the telephone after placing the toll call.

e. The estimated number of toll circuits between various points for the period studied, usually a 15 year period.

f. The type and ultimate size of the toll switchboard for various exchanges in the territory; that is, our toll fundamental plan gives us a very good indication of the amount of toll traffic we can expect 15 years hence in our various exchanges, and having that information available, we are in a position to specify the type of board that will be adequate for the requirements for a 15 year period. Otherwise we might instal a board we would outgrow in five or ten years, making it necessary to replace it.

Q. Well, as the growth of the business utilized the ca- [fol. 9426] pacity of the board, to what extent does your fundamental plan contemplate keeping the capacity of the board 15 years in advance of its requirements?

A. The point I had in mind was this, Mr. Dotson; let us assume that we are considering Findlay, Ohio, and we have a new office in mind for Findlay, say. We might, without a toll fundamental plan, instal what we would call a low type tollboard that would be adequate for a certain number

of toll lines. However, a toll fundamental plan might indicate that the toll lines required in Findlay 15 years hence would require a board having a greater capacity, in which case we would instal in initial installation the type of board that would serve us 15 years hence.

Q. How can you determine the different types of board which you have mentioned, as to which you would select without a fundamental plan?

A. Well, we make our—we make the best estimate possible if we haven't that information available, but that is why we make—that is one of the reasons for making a toll fundamental plan, to have such information available and to minimize false work.

Question. If a fundamental plan takes care of the force requirements for 15 to 20 years, how often is a fundamental plan made?

Answer. A fundamental plan is not made for the purpose of getting the force requirements 15 or 20 years hence. However, if we had occasion or wanted to know how many people we would have in a certain office 15 years hence, the information shown in the toll fundamental plan would provide a basis for obtaining that data. That is, we would in [fol. 9427] our toll fundamental plan determine the number of switchboard positions required 15 years hence, and the number of operating employes has a fairly definite ratio to the number of switchboard positions.

Mr. McConnaughey: What is that ratio?

The Witness: Well, it will vary with different types of exchanges. It will run between 2 and 2.8, some place in there.

Question. What proportion of the total cost of the fundamental plan does the part covered by traffic bear to the total?

Answer. I do not know. I have never seen a distribution of expense according to the department along that line.

Q. Do you know whether there are any records kept by the Company from which such information can be secured?

A. No, I do not think we could get that accurately, Mr. Dotson, for this reason. Take in the traffic engineering office, for instance, it is not possible, it is not practicable to assign a man to one job exclusively for a period of, say, two or three months. There is certain routine work that must be done and it would be very difficult to apportion ac-

curately a man's time to the various general studies he makes. We always have a number of general engineering studies under way and where studies are of a general nature we do not try to apportion the cost definitely.

Q. Well, Mr. Anthony, what kind of information do you assume would be necessary for you to have, or any one to have, in order to answer that question, in order to formu-
[fol. 9428] late a statement which will show the proportion of the total cost of fundamental plan in relation to the part covered by traffic?

A. Well, it would be necessary to keep a detailed record of the time of each employe engaged in the fundamental plan. Part of his time might be taken up in some other investigation.

Q. You do not think the Company has a record in such form as would enable you to secure the information to enable you to answer the question as it is put?

A. I think not, Mr. Dotson.

Q. Alright; proceed.

A. Question. What was this cost in Toledo when the last fundamental plan was made?

Answer. I presume you have in mind an exchange fundamental plan?

Q. Yes.

A. And the same answer would apply in that case. I have no such information.

Question. When was the last fundamental plan made?

Q. For Toledo.

A. I presumed you had in mind Toledo.

Answer. The last fundamental plan for Toledo was made in 1920.

Q. That was prior to the consolidation of the two telephone systems?

A. Yes, but it took into consideration the merged requirements, so that it is on a merged basis.

Q. Then the fundamental plan prepared at that time answers the merger purposes of the company?

A. That is right.

Question. How do you check your single ticket method for accuracy; in other words what is the control?

[fol. 9429] Answer. I presume you had in mind in connection with that question the writing of the ticket at the originating office. Our service observing provides means for such a check.

Q. In your answer you used a term that I think we ought

to know a little more about, when you say that is done by service observing.

A. I mean this, that as a general proposition we make observations of our local and toll service observing actual calls.

Q. Who makes that observation?

A. The traffic department of the telephone company in all detail, and a record is kept of those observations.

Q. What does this record show?

A. That shows the entire progress of the call. It shows the calling number and the called number, and the detailed steps of the call.

Q. Meaning the time consumed in placing the call and the period of time the conversation covered?

A. That is right. In the case of toll it shows when the subscriber was connected or when he was given a report, in case his party could not be reached. It shows the reason for not completing the call, for instance, "Busy line," or "Don't answer," or "Out of town," or whatever it might be.

Q. That data is prepared by the calling operator, is it not?

A. No, the service observing is done by special service observing operators who are located as a rule in a room separate from the toll switchboard.

Q. Do these observing operators observe every call that is placed? Is that their specific duty, in other words?

A. Oh, no, we do not observe every call that is placed. [fol. 9430] We observe enough calls so that our people know that they are getting a representative picture of the service.

Q. These observing operators supplement their own observation with the observations or knowledge of the operator who handles the message?

A. No, that is another feature of the work. We do what we call central office instruction work where we have special instructors observing the progress of calls, especially those calls handled by new operators, and if upon completion of a call the observer or central office instructor finds that the operator has made an error of some kind, the call is discussed with the operator in order to assist her in the future.

Q. But a case of that kind is not included in the check you make of your single ticket method?

A. The point I make there, Mr. Dotson, is this, that we have a check on that ticket for those calls that were observed and that number of calls is sufficient to indicate to us what sort of a job is being done, and if we have occasion to check

the writing of tickets in any particular office the service observing facilities provide a means for doing that, as we could check every call that is made, getting a 100 per cent check on it.

Question. Referring to the No. 1 C board, as we understand it this is the full feature multiple lamp board. What is the average time to complete an A Board call?

Answer. I think Mr. Allen in his testimony gave a figure of 8½ seconds.

[fol. 9431] Mr. McConnaughey: 8.7.

The Witness: I thought he said 8½.

Mr. McConnaughey: He said 8½ originally and he said he had verified it.

The Witness: I think he said 7 second- originally, his original figure. In his original figure he said he did not have a record of it but it was his recollection that it was 7 seconds, and yesterday I believe he said in verifying that he found it was 8 seconds. That was on the LaCrosse board, and I think he said 8½ seconds on the Youngstown board, which is a 1 C board.

Mr. McConnaughey: 8.7.

The Witness: We have no occasion to use such a figure. I do not know anything about it. The A. T. & T. do all of the time study work and we are concerned with what is known as a coefficient or the load.

Q. You mean now to refer us to Mr. Allen's answer on that?

A. That is right. We make no studies in Ohio. We use the coefficients developed.

Question. What is this in traffic units and what is a traffic unit?

Answer. The basic coefficient for a 1 C board is 8.7 of a traffic unit. In setting up the traffic coefficients the A. T. & T. Company has designated as a traffic unit the work required to complete a flat rate call direct in a A board multiple. That is known as a coefficient of one, of one unit.

Question. What is the answering time on a board equipped [fol. 9432] with a traffic distributor?

Answer. The answering time on a board equipped with a traffic distributor or any other kind of a board depends entirely on the provision of operators; that is, the number of operators provided at the switchboard, and the switchboard has—the design of the switchboard—no bearing on that.

Mr. Dotson. Read that answer.

(Answer read.)

Mr. Dotson: Alright.

The Witness: Question. How does it compare with the No. 1 C or full feature manual?

Answer. As I stated in the preceding answer, it is entirely a question of the number of operators provided, and as Mr. Allen stated yesterday or today in studying the various types of switchboard we always do it on the basis that we will give the same grade of service regardless of the type of switchboard. The rest of it is a matter of cost.

Question. How many traffic units or what portion of a traffic unit is utilized in completing a call on this type of board?

Answer. I presumed that has reference to the 1 C board, and that is .87 of a traffic unit, as I said in one of the previous answers.

Question. How does it compare with full automatic and auto-manual operation, covering comparison by traffic units?

Answer. There is no operator involved in a full automatic call and a comparison of traffic units on a manual board and the auto-manual board would not be a fair comparison [fol. 9433] for the reason that the auto-manual is a partial automatic system. It is a different type of switchboard.

Q. It would make a difference, would it not?

A. Yes, I think there would be a difference. I don't know what it would be exactly.

Q. Could you make any comparison whatever?

A. Could I?

Q. Yes.

A. No, I don't know. I don't know what the traffic unit is on a manual board. The General Staff of the A. T. & T. Company have made studies. I think Mr. Allen said he made quite an exhaustive study at Lima some time ago and that they never recommended the board. In fact, all of their studies indicated a case could not be made for an auto-manual switchboard. Therefore the Ohio Bell Company has never had occasion to use that type of switchboard.

Q. The Ohio Bell has no means or any records showing what the traffic unit would be on an auto-manual?

A. There may be something in our files. If not, we could get it very easily by getting in touch with the A. T. & T. Company, getting the results of their study. They have studied all of those boards.

Q. Will you please note that and see if you can secure that information?

A. Yes, I will be glad to do that, Mr. Dotson.

Q. Then can you say with reference to the automatic traffic unit—what have you to say with reference to what would be the traffic unit of the automatic switchboard?

A. Of course we do not have an operator in connection [fol. 9434] with the full automatic call, so that I do not know how you would state a figure of that kind.

Question: Under average conditions including the average number of outgoing trunks, what is the practical unit of manual operation?

A. I do not understand your question, Mr. Dotson. That is, the number of outgoing trunks has no definite bearing on the units. I do not know just what you may have had in mind in that question.

Q. Now, just a moment. The question was one propounded by our engineers and neither one of them are here—as they desired some information from your point of view on that matter; so I could not throw any particular light on it other than the question itself.

A. I do not know what they may have had in mind. As I say, the number of outgoing trunks has no definite bearing on the units. They probably had something definite in mind but did not bring it out in the question.

Q. If there is anything to it before you leave the witness stand we will probably interrogate you.

A. I would be glad to answer the question.

Question. Also furnish full details and supporting data of the following:

1. Single ticket toll operating method against two ticket method showing the savings claimed of $570,000.00 in 1923.

The Witness: I might note here that the savings I showed were $570,206.00.

2. Prepay coin boxes showing the average claimed of [fol. 9435] $139,031.00.

Mr. McConnaughey: Is that right, "the average claimed"?

The Witness: Did I say that? The question is, "Prepay coin boxes showing the savings claimed——"

Mr. McConnaughey: You said "average".

The Witness: Of $139,031.00.

3. Machine ringing showing a savings of $267,377.

4. Overlapped ringing showing a savings of $76,318. and showing in what particular this is an advantage to the subscriber.

Answer: 1.

The numbers I give will correspond to the numbers under the question.

1. The savings for the year 1923 due to using the single ticket toll operating method instead of the two ticket toll operating method were arrived at as follows: The number of calls handled was 5,519,900. The saving per call in operating and switchboard expense was 9.52 cents. The saving per call in toll circuit expense was .81 cents. The total of the savings per call for both of these items, that is operating and equipment expense and toll circuit expense, was 10.33 cents; on the basis of the 5,519,900 calls and the saving which we made of 10.33, the total saving was $570,206.00.

Q. That saving, may I ask, represents the reduction in cost of furnishing the service?

A. That is right. The point is that if we did not have in effect during the year 1923 the single ticket toll operating method it would have cost the company for the traffic [fol. 9436] handled $570,206 more than our cost actually was.

Mr. Shuler: Now, supposing, Mr. Anthony, that during the time these calls were going through the girls were never busy and they could have done it by the double call or dispatch method or any other method, then there would not have been any saving at all, would there?

The Witness: The dispatch method is an——

Mr. Shuler: I do not want any dilation. I simply want to know whether or not your saving is not based on this proposition solely, that the girls were always busy making calls and by virtue of the single ticket method they could make that many more calls in a given time, and therefore that would be a saving. But supposing the girls were not busy all the time and by using the single ticket they had a lot of extra time on their hands, then there would have been no saving made at all?

The Witness: Of course if we do not keep our operators busy naturally instead of saving money we would lose money.

Mr. Shuler: Now can you give us the number of operators

you had in your employ devoted to this class of service previous to the single ticket system's introduction and the number you now have in your employ per hundred thousand calls or per thousand calls, I don't care which you make it; it is easy for you to sit down and figure out operator savings but the only way to show savings is to show where the money is or where the money would have gone.

[fol. 9437] The Witness: These savings I showed here represent the actual savings. There isn't any question about it. The point is this if the single ticket method had not been in effect in 1923 we would have organized on the basis of certain loads, which would have required a certain number of operators. Now with the single ticket method we organized on the basis of higher loads per operator, which naturally decreased the number of operators required. Now it is not practicable to get at the matter in the way in which you suggest for this reason, that comparing one year with another you have other variable factors. For instance, you have growth in your toll business. If our traffic remained constant over a period of years and no other changes were made it would be practicable to determine exactly the number of operators—that is, I mean when I say "exactly", from the records—the exact number of operators. But that condition of course will never exist, so that we have to get at it in another way.

Mr. Shuler: Isn't this the simplest way to get at it, to find out how many girls you used to employ and how many you now employ and that will show you the precise saving?

The Witness: You cannot get that, Mr. Shuler.

Mr. Shuler: Why?

The Witness: I say you can only get that under these conditions, first, that over a period of years your toll traffic remained constant, and further that during those same years no other changes were made in the operating conditions. Then, if this were the only change made, annual growth, we [fol. 9438] could take an actual number of operators during the year 1922, or whatever year the method was introduced, and the number in '23, and get at it. But this does represent a saving.

Mr. Shuler: Now you say you organized for this condition; when did you put your organization in?

The Witness: The single ticket method, as Mr. Allen has stated, has been introduced gradually during a long period of years, kept pace with the improvement in toll transmis-

sion, which is one of the things necessary to have under the single ticket basis. I cannot tell you exactly when the method was introduced. It was in effect when the Ohio Bell was organized and I know personally it was in effect seven or eight years ago and Mr. Allen stated this morning it was developed in 1907, and on that basis it has been introduced gradually since that time.

Mr. Shuler: As a matter of fact your toll operators are never busy all the time, are they?

The Witness: Yes, sir.

Mr. Shuler: They are?

The Witness: Absolutely.

Mr. Shuler: As a matter of fact it has been just within a few years you made a change in your toll rates during certain periods of the night in order to increase business, haven't you, when times were dull?

The Witness: There has been a change in the rates, a lower rate during the evening and night hours.

Mr. Shuler: Two changes, two different rates, before 12, isn't it, and after 12 at night?

[fol. 9439] The Witness: That is right.

Mr. Shuler: Just for the purpose of building up business at that time of the day?

The Witness: The main consideration there, Mr. Shuler, is this, we have a fixed investment, plant investment; we have the same amount of plant in the evening and night as we do during the day and by having a differential in our toll rates it makes it possible to use a larger percentage of our toll plant during the evening or night hours than was practicable previous to that time. Operators you can take off, but you cannot take a switchboard position out.

Mr. Shuler: I know that, but if your operators were not busy on toll line service from five o'clock in the evening until seven o'clock the next morning, but had plenty of time to take care of the business, then no saving would be made by the single ticket method to any extent, would it?

The Witness: Oh, yes.

Mr. Shuler: There would?

The Witness: In the first place we do not keep on duty after five o'clock more operators than we need, nor did we keep on duty when the two ticket method was in effect more operators than we needed, and furthermore we get the big benefit of the single ticket method in the busy hours. That is where we save the most money.

Mr. Shuler: But you are claiming the same saving during the dull hour as you are during the busy hour?

The Witness: We get it. I am claiming just what we get.

[fol. 9440] Mr. Shuler: Can you tell us how many operators you had on from five o'clock in the evening until seven the next morning previous to the single ticket method and under the two ticket method? I do not suppose you can.

The Witness: This is introduced over a period of years and the growth of the business and other things would make it impracticable to get such information.

By Mr. Dotson:

Q. Isn't this practically the fact underlying the amount of savings you claimed arrived at in this way, that with the same number of operators after the introduction of the single ticket which you had prior to its introduction you were enabled by the single ticket method to increase the number of toll calls or the amount of toll business which the same number of girls handled over what they would have been able to handle if they had had the double ticket method?

A. Yes, and that is——

Q. And that is another element that exists, and because of the saving in time of handling which was due to that fact, you figured that that difference in time represented a certain cost which you have saved; in other words, if it took an operator under the two ticket method, say five minutes, as an illustration, to handle one call and under the single ticket method it took two minutes, you have saved 3/5 of the time of that call, of that operator, which is available for another call? Now it is upon some such basis as that and considering that element that you have arrived at this saving?

A. That is one way of putting it. Maybe I can make it [fol. 9441] clearer this way. The introduction of the single ticket method decreased the work of the operators 39 per cent. Now if it required 100 operators to handle a given number of calls on a two ticket basis, we can now handle the same number of calls with 61 operators; in other words, we save 39 operators.

Mr. Shuler: Now, Mr. Anthony, this is based on something. Now, isn't it based perhaps on the number of calls a girl can now handle per hour?

The Witness: I think I can give you some information, Mr. Shuler, that will clear that up. With the single ticket method we save 16 approximately 16 units per average call.

Mr. McConnaughey: How do you save them. Will you state that as you go along?

Mr. Shuler: That is what I want.

Mr. McConnaughey: How do you effect that saving?

The Witness: Under the two ticket method the average call required 40.59 units of work. With the single ticket method the average call requires 42.48 units of work. That is a reduction of 16.11 units of work per average call.

Mr. Burr: Let us have your figures again?

The Witness: Yes. With the two ticket method the average call required 40.59 units of work. With the single ticket method the average call requires 24.48 units of work. Now the savings is 16.11 units of work per call, per average call. 16.11, divided by 40.59 calls, is 39.6 per cent, which is [fol. 9442] the per cent reduction in operating work due to the use of the single ticket method.

Mr. Shuler: That does not give me much light. Supposing in an hour's time a girl can make a certain number of calls under the two ticket system. Now you say that that same girl in that same time can do or answer a certain larger number of calls, and then because theoretically she cannot, you say the company has saved some money. Then what we would like to know is on the basis of 5,519,900 calls how many girls are required to make those calls in order to obtain a saving of $5,070,000.00?

Mr. Dotson: $570,000.00.

Mr. Shuler: $507,020.00. Now I want to know what, as a matter of practice, does happen in the exchange?

Mr. Dotson: The amount should be $570,206.00.

The Witness: Well, I haven't worked this out on the basis of operators, Mr. Shuler.

Mr. Shuler: That is my objection.

The Witness: But that would be a result of the method I used. For instance, we adjust our force in this way. As Mr. Allen explained, we determined how many units we must take care of during each half hour period of the day and we supplied operators in accordance with that figure. Now, if, in a given office, we are, say, under the two ticket method of operation, we had 10,000 units during a given hour, we would supply a certain number of operators. However, with the single ticket method that number of operators

is reduced to 6100. Therefore the number of operators required with the single ticket method would be reduced ap-
[fol. 9443] proximately in that ratio.

Mr. Shuler: Here is what I want. You folks can actually show actual earnings, actual losses, without theories. Now if you will give us the number of calls during that year and the number of girls that were required to handle them, what I am trying to find out is whether or not those calls were not handled and could not have been handled under the two ticket system just as easily and efficiently as they were actually handled under the one ticket system, and I believe they can, because I do not think your girls are so rushed that they required the single ticket method.

Mr. Burr: Is that a question or what is it?

Mr. Shuler: I am trying to enlighten him as to what I want.

The Witness: Your statement assumes that until we introduced the single ticket method we did not use our operators efficiently.

Mr. Shuler: No, no, not at all that.

The Witness: I think your statement says that.

Mr. Shuler: No, it does not say that. It is simply this. If you had your girls working to capacity 24 hours a day this item of the single ticket method will eliminate the employment of a certain number of girls but my contention is in actual practice you are not so busy as that and that you make no actual savings at all. In other words, it is the old Colonel Sellers proposition. He has an eyewash; there are 300,000,000 people in India with bad eyes. There is so much theoretical profit in it, but the trouble was that he could not sell his goods. That is the way with your proposition.

[fol. 9444] The Witness: Absolutely not. Let me explain it this way, we know an operator can handle a certain number of units. That has been developed by the A. T. & T. Company.

Mr. Shuler: That is what I want you to show.

The Witness: We have been using their unit system for years and we know what an operator can handle. Now, as I said before, if during a given hour of the day with the two ticket method we must take care of 10,000 units, then we introduce the single ticket method and we cut that to 6100 units, we know that we cut our operating force because the unit capacity of the operator remains the same.

Mr. Shuler: You ask me to take that as a fact. I ask you to show me the figures showing it to be a fact.

The Witness: What kind of figures?

Mr. Shuler: I want the figures for a month showing the number of calls the girls took care of, the number of calls they took on their own trick, and I will show you on your own figures for at least 19 hours of the day those girls could have handled these calls on the double ticket system, and therefore instead of saving this large amount of money you make nothing like that saving.

Mr. Burr: That is about the twentieth speech Mr. Shuler has made and it seems to me fair to the witness that instead of what Mr. Shuler proposes to prove, he ought to propound questions.

Mr. Shuler: I will propound the question now simply. [fol. 9445] Will you furnish me with a record of toll calls for one month, the number of girls devoting their time to that service and the hours of the day when the calls were received?

The Witness: Yes.

Commissioner Maullar: You mean in just one office? You don't want that generally?

Mr. Shuler: Oh, no, just the State of Ohio.

Mr. Dotson: Instead of "me", make it "us".

Mr. Shuler: I want the practice and not the theoretical result.

Commissioner Maullar: Just one office will be alright, won-t it?

Mr. Shuler: Oh, yes.

The Witness: I was going to say more than that would be a laborious proposition. I can give that to you.

Mr. Shuler: Miamisburg, Ohio, will do.

The Witness: This is the second part of the answer to that question. It is No. 2. Savings for the year 1923 due to using prepay coin box method instead of postpay coin box method.

Mr. Burr: You are now directing this to Mr. Dotson's questions?

The Witness: Yes, sir, I am still answering his list of questions.

The number of calls handled during the year 1923 was 24,179,300. That by the way is for Cleveland only. I have not included in the prepay savings anything for the other

[fol. 9446] cities, as the records were not available the day I was working on this.

By Mr. Dotson:

Q. What was that figure you just quoted?

A. 24,179,300 calls.

Q. That is just in the Cleveland area?

A. That is right, in the City of Cleveland. The saving per call in operating is .575 cents. That saving per call applied to the 24,179,300 calls gives an operating saving for the year of $139,031.00.

Q. That saving is determined exactly on the same basis as the savings that you arrive at with reference to the single ticket toll instead of the two ticket method?

A. In general, yes. It is comparing the work, the units involved in one method with the work that is involved in the other.

Mr. Shuler: Now, Mr. Anthony, explain how that savings occurs.

Mr. Burr: Wait a moment. Mr. Shuler, are you the one who was going to undertake the main examination of Mr. Anthony?

Mr. Shuler: No.

Mr. Burr: Is Mr. Dotson the one who is?

Mr. Dotson: No, I am only covering this part of his examination.

Mr. Burr: It would be my suggestion that Mr. Anthony be permitted to finish his answers to Mr. Dotson's questions and that Mr. Shuler follow with his questions.

Mr. Shuler: Isn't it better to clear it up as we go along [fol. 9447] and then you have a connected story instead of a disconnected story.

Mr. Burr: I cannot see that you are clearing it up. You are making a speech on these different questions and arguing the case, but I do not see that we are getting very far in the matter of questions and answers. That is not intended to reflect on you, Mr. Shuler, but——

Mr. Shuler: The trouble with your witnesses is that they do not seem to be able to answer yes or no.

Commissioner Maullar: How many more questions have you there?

The Witness: This is the last—no, it is not. I have two more subdivisions of this one and then maybe a half dozen other questions.

Vol. IX

TRANSCRIPT OF RECORD

Supreme Court of the United States

OCTOBER TERM, 1936

No. 539

THE OHIO BELL TELEPHONE COMPANY,
APPELLANT,

vs.

THE PUBLIC UTILITIES COMMISSION OF OHIO

APPEAL FROM THE SUPREME COURT OF THE STATE OF OHIO

FILED NOVEMBER 20, 1936.

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Mr. Dotson: Three others.

Mr. Shuler: I do not care only for the methods, Mr. Anthony, if you are going to answer my question.

The Witness: It is in general the same method as we use in connection with the single ticket and the two tickets.

Mr. Shuler: What operations are saved?

The Witness: Oh, with the postpay coin box method that was in effect prior to the adoption of prepay it was necessary for the operator to ring the called subscriber and get him on the line, then come back and have the calling subscriber deposit his coin. With the new method she handles the call practically as she would any call except that she depresses a key to return or collect the coin.

Mr. Shuler: In the postpay I go up, I take the receiver [fol. 9448] off and put it to my ear and the girl answers, isn't that right?

The Witness: Right.

Mr. Shuler: I then tell her the number desired?

The Witness: Yes.

Mr. Shuler: She then gets the number and says to me "Drop a nickel", doesn't she? She immediately goes off to work and I have my conversation. Now that is the postpay. Now the prepay, I go there and I drop my nickel in the box. I take off the receiver and the girl says "Number, please"; I give her my number; she gets me my number, doesn't she, and she waits to see whether I do get my number, doesn't she?

The Witness: No.

Mr. Shuler: Yes, she does, because if I don't get my number she gives me my nickel back, if I wait long enough.

The Witness: Let me explain this; with the postpay method the operator rang the called subscriber and waited until he answered; he might take a minute, two minutes or three minutes to answer. She is waiting all that time. Then she comes back to me and says "I have your party; please deposit five cents".

Mr. Shuler: Yes.

The Witness: With the prepay, when she gets your number she plugs into the called subscriber's jack or trunk as the case may be and then goes ahead and handles another call.

Mr. Shuler: Makes me stand there and wait.

[fol. 9449] The Witness: No, the called subscriber's bell is being rung; it may take a couple of minutes for him to answer his bell. In the meantime the operator knows what the status of the call is because she has some lamps on her key shelf that indicates to her that your party has either answered or he has not. In the meantime she is working on other calls and is not wasting her time waiting on this subscriber.

Mr. Burr: Isn't the difference, in the post pay your operator is held on the calling subscriber's line and has to stay there and do nothing else until the called subscriber either answers or refuses to answer?

The Witness: That is right.

Mr. Burr: Whereas in the prepay system the moment the operator puts up the connection she is released and can attend to other calls and can go about her regular business pending the time when the called subscriber answers or fails to answer?

Mr. Shuler: Then I stand there and cuss or walk away and leave my nickel in the box.

Mr. Burr: You wouldn't have left yours there, Mr. Shuler.

Mr. Shuler: Oh, I don't know. John Stockwell had to sue your company to get his nickel back.

The Witness: I might state that what makes it possible or practicable with the prepay method for the operator to go ahead with another call pending the answer of the called station is that the nickel has been deposited and is being held in suspense.

[fol. 9450] Mr. Shuler: Not as much as I am.

The Witness: If the subscriber does not answer the coin is returned.

3. Savings for the year 1923 due to using machine ringing trunks instead of manual ringing B trunks.

The number of calls handled during the year 1923 was 278,708,900. The operating saving per call was .075 cents. That figure applied to the number of calls given made a saving of $209,032.00 in operating expense for the year 1923. By operating expense I have in mind traffic operating expense. The mashine ringing method decreases the number of operators required and also decreases the number of switchboard positions required.

Mr. McConnaughey: How do you figure that 7.5 or .075 cents?

The Witness: It is .075

Mr. McConnaughey: .075. How do you figure it?

The Witness: Can I just finish the answer?

Mr. McConnaughey: I don't want to interrupt you but I wish you would state that.

The Witness: I will, if you will let me finish this, and I will have the exact answer.

Mr. McConnaughey: Alright.

The Witness: The reduction in the number of switchboard positions after allowing for the increased cost of machine ringing trunks was $58,345.00. The sum of the operating and switchboard savings was $267,377.00.

Now, in answer to Mr. McConnaughey's question, the units per average call on the basis of manual ringing B [fol. 9451] trunks was .697. The units per call for the average call under machine ringing operation was .528. The reduction in the units per call with machine ringing trunks is .169 units per call. Or, in other words, the reduction in operating work is approximately 25 per cent.

Mr. McConnaughey: Now, that is 25 per cent of what, the cost of an average call, have you figured that out?

The Witness: It would be that too. The units per call under manual ringing operation, as I just stated, is .697. Now the saving under machine ringing operation is .169. .169 divided by .697 equals 25 per cent, which is the reduction in the work per call with the machine ringing method.

Mr. McConnaughey: That is 25 per cent of some amount of money you are using?

The Witness: Why don't you ask me for the reduction?

Mr. McConnaughey: That is alright, but you have not gone quite far enough.

The Witness: I can give you all that information, Mr. McConnaughey. The cost per unit is .4464 cents.

Mr. McConnaughey: That cost would apply in each of these figures of savings, wouldn't it?

The Witness: That is right, same cost. The units per call saved equals .169. The saving per call is the product of those two figures, or .075 cents, and that applied to the number of calls handled gave us the $209,032.00 for the operating savings.

Mr. McConnaughey: That is, that unit that cost .4464 is [fol. 9452] 1/230 of an operator's hour, is it?

The Witness: Well, that is the cost per unit average for the entire company, and——

Mr. McConnaughey: But what is that unit? Is that this traffic unit that you have been talking about?

The Witness: That is based upon a busy hour load of 230 units per hour. If it happens to be an office where we have an extended busy hour, or 245, where we have a peak on local—toll busy hour requirements are always based on 230 units. It is the same traffic unit we have been talking about.

Mr. McConnaughey: That is what I understand.

By Mr. Dotson:

Q. Are you through with your answer to No. 3?

A. Yes, I answered the question, Mr. Dotson, and then answered the inquiry made by Mr. McConnaughey.

Q. Yes, that is alright.

A. 4. Savings for the year 1923 due to using overlapped ringing toll operating method.

The number of calls handled during the year 1923 was 5,363,200. The saving per call in operating that equipment is 1.09 cents. The saving per call in toll circuit expense is .333 cents. The saving per call for both of these items, that is operating and equipment expense and toll circuit expense, is 1.423 cents. This, applied to the number of calls handled, gives a saving of $76,318.00.

Now, under this item I was also asked to explain in what particular this method is of advantage to the subscriber. The answer to that is, first, it speeds up the service; that [fol. 9453] is the overlap ringing method provides for a faster service to the subscriber.

Q. You mean it shortens the time in which the subscriber can avail himself of the service?

A. That is right. Inasmuch as the calling subscriber is in on the connection when the called subscribed answers it makes it possible for the calling subscriber to rectify any error that may have been made by him or the operator in the details of the call and it makes it possible for him to give new instructions if the report he gets is such that he thinks that advisable. And another point is that with the old method, where the called subscriber was brought to his telephone before the calling subscriber was brought to his, placed on the called subscriber the burden of waiting, doing all the waiting. As a matter of fact, at least part of the

waiting and probably the greater part of it should be placed upon the calling subscriber, because he is the man who originates the call. But with this new system it means that neither subscriber waits on the other. They are both brought to the telephone at the same time.

Q. Had you something further on that?

A. No, that is all on that question.

Q. The saving that is computed on No. 4 as to overlap ringing is based upon the saving of equipment principally, reduction in amount of equipment and amount of equipment required?

A. Yes. The overlap ringing method has resulted in a reduction of per cent in the outward operator's work time and we get a corresponding reduction in equipment invest- [fol. 9454] ment and we also get a reduction of something over five per cent in the use of toll facilities, and this saving I have given is based upon those factors.

Mr. Shuler: Do you explain that saving in equipment to the engineers when they appraise property that is used and useful in rate cases?

The Witness: The point is we do not engineer as much equipment, we do not order as much equipment any more, due to the fact that we have this more efficient operating method. That is true with all of these savings.

Q. In fact, the same basis of computing your savings in this respect as that which you have noted in answering the other questions?

A. That is right. Now, in this particular method I can give you a little more information for the reason that this method is a very recent development. We introduced it in 1922 in the——

Q. Is it in general use?

A. Yes.

Q. It is the only method in use now by Bell Associated Companies?

A. It is one of the methods.

Q. Does the Ohio Bell employ this method entirely?

A. On all the traffic that we can apply the method on. For instance, on an appointment call we do not use the overlap ringing method because there is a case only of attempting to get the two subscribers together. We are going to tell him that Mr. Smith would like to talk at six o'clock.

Q. All of these savings you have testified to pertain to the Ohio Bell operation?

A. Oh, yes, they are all Ohio Bell, yes.

[fol. 9455] Commissioner Maullar: It is four thirty, Gentlemen. This case will be resumed Monday, the 19th. We will have two days then, Monday and Tuesday.

Mr. Burr: On Monday, the 19th, I may have another witness and with the consent of the Commission and the gentlemen on the other side we will put in his testimony between the cross-examinations.

Mr. Shuler: Can you tell us on what points he is going to testify, Mr. Burr?

Mr. Burr: I do not know yet. I have not talked to him.

And thereupon the further hearing of this matter was adjourned to Monday Afternoon, May 19th, 1924, at 1:30 o'clock.

. . . . . .

[fol. 9456] Monday Afternoon Session

May 19th, 1924.

And also EDWARD V. Cox, called as a witness on behalf of The Ohio Bell Telephone Company, being first duly sworn, testified as follows:

Examined by Mr. Burr:

Q. You may state your name?

A. Edward V. Cox.

Q. What is your age, Mr. Cox?

A. 50.

Q. Your residence?

A. Plainfield, New Jersey, near New York.

Q. Occupation?

A. I am employed by The American Telephone & Telegraph Company as assistant vice president.

Q. What has been your engineering education, if any?

A. Graduated from Sheffield Scientific School of Yale University in the year 1894 with the Degree of Bachelor of Philosophy and then entered the School of Mines of Columbia University, and the following year, 1895, graduated with the Degree of Electrical Engineer.

Q. When did you first enter the telephone business?

A. The summer of that same year, 1895.

Q. Have you been engaged in that business ever since that time?

A. I have been continuously employed by the American Company from that day to this.

Q. What was your employment with the American Company between the years 1895 and 1899?

A. I entered the plant work of the Company and had [fol. 9457] charge of installing subscribers station equipment and central office equipment, maintaining it, also submarine cables and the inspection of outside plant, some right of way work, very general experience in all phases of that outside and inside plant work. During that period I was employed under the titles of inspector and general inspector and assistant wire chief.

Q. From 1899 to 1907 what were your duties?

A. I was in the engineering department and there I had charge of design of apparatus and circuits. I had charge of the repair show which repaired not only the apparatus of the company but tools and equipment of all kinds. I also had charge of the design and also the field construction of all of the underground conduit work that was done by the company within those years. That included such long systems as between New York and Philadelphia, New York-New Haven, Boston-Providence, Chicago-Milwaukee.

Q. Now, from 1907 to 1911, you were special agent to the general superintendent of plant in charge of office management, I believe?

A. Yes, sir, that is right.

Q. What were your duties in that connection?

A. I had charge of seeing that the personnel of the office of my superior as well as the offices at other points was properly balanced, that they had the right men for the work. I had charge of the laying out of the procedures by which the various steps in the work should be accomplished. That included accounting as well as statistical work of all kinds involved in recording the work of that plant department.

Q. Succeeding that employment what kind of work did you do next?

A. I was next appointed chief accountant of the company. [fol. 9458] That was in 1911 and was right at the time when the Interstate Commerce Commission was making its investigation preliminary to establishing the Uniform System of Accounts, and I personally conducted a very large number of those negotiations, appearing at Washington and also

meeting the representatives of the Commission in various parts of the United States. Then, once the Uniform System of Accounts had been promulgated, I was in charge of the work of revamping the procedures of the telephone company to agree with that system. I had no charge at that period of the actual keeping of the accounts. It was what I like to think of as the engineering of accounts. It was determining the procedures and the best methods of accomplishing the results that were desired.

Q. Following that, what was your employment with the American Company?

A. For about a year I was general auditor in charge of the books of the general department, and then became a supply contract auditor with the duties of checking through the contracts and all phases of the supply program. That continued until about 1922 when I was appointed to my present position of assistant vice president.

Q. As assistant vice president what are and have been your duties?

A. These duties revolve around the supply work of the Associated Companies. They tie in fundamentally to the supply system furnished through The Western Electric Company. They are not confined to that system. I must know that the general supply contract is operating properly. If there is any way that I can improve it, why, I see that those recommendations are made. If there is any way [fol. 9459] that I can make it more advantageous to the Associated Companies it is my duty to do so. Beyond that, however, I go into the Associated Companies themselves. I do not stop with The Western Electric Company. I go into the companies themselves and follow their supply work so as to be sure, if I can suggest anything in the way of making their service more efficient and less costly, I shall make those recommendations to the company for their consideration. And I have had my men in this particular territory at least three times last year, and I think more, making trips of inspection and recommendations based on those studies.

Q. Are you in the employ of The Western Electric Company?

A. I am not, and I never have been.

Q. In the performance of your duties as assistant vice president, do you or do you not check the purchases by the

Associated Companies from The Western Electric Company?

A. Yes, sir, I do. The supply contract has, as one of its provisions, that the charges to the Associated Companies shall be uniform to them all, that is to say, they are at the most favored customer price, which necessarily operates that they shall be uniform as well as to be low. I check through my organization to see that those conditions are maintained in all parts of the United States. I also see that the prices which The Western Electric Company charge are reasonable as compared with charges, or prices, I should say, that can be gotten from other suppliers.

Q. Are you familiar with the relation existing today and which has existed between the Associated Companies, including The Ohio Bell Telephone Company, and The [fol. 9460] Western Electric Company?

A. Yes, sir, I am.

Q. Will you trace, if you please, the development of those relationships, commencing with the inception of The Western Electric Company?

A. The Western Electric Company in its inception considerably antedated the advent of the telephone. It had its inception in the firm of Gray & Barton in the year 1869. Gray was a very prominent inventor and Barton was a business man, and the firm was successful from the start. In the year 1872 the firm became The Western Electric Manufacturing Company. It manufactured at that time call bells and batteries and similar electrical devices of the period, manufactured the instruments used by The Western Union Telegraph Company, and it took over the shops of The Western Union Company at Ottawa, Illinois, and grew very rapidly.

Q. That was before the American Company had anything to do with it?

A. It was before the telephone was invented.

Q. Yes.

A. The Company grew very rapidly and at the time of the Centennial Exposition in 1876 the telephone was first presented publicly at that Exposition. The Western Electric Company had awarded to it at that same Exposition 50 awards for the excellense of its manufactures. In fact they were recognized as of the type equivalent to instruments today that——

Mr. McConnaughey: May I interrupt to ask what is the source of your information?

The Witness: It is from the Standard Works, Herbert Classon's History of the Telephone, One Man's Life, and [fol. 9461] so on.

Mr. McConnaughey: It is beyond your own personal experience?

The Witness: Oh, yes, this is gotten from general sources.

Mr. Burr: We do not insist upon it but I thought it might be interesting to have in the record here in a more or less condensed form a very short history of the early relations between The Western Electric Company and the trade in general and how the telephone business became allied with it.

Mr. McConnaughey: I don't know that I care to object to it but I just wondered what the source was.

Mr. Burr: It will take but a very short time.

The Witness: In 1877 the Western Union Company actively entered the telephone field in competition with the Bell Companies and the Western Electric Manufacturing Company manufactured the devices that were used by The Western Union Telegraph Company. There was a very bitter war between the Bell interests and the Western Union, and in 1879 the Western Union acknowledged the validity of the Bell patents and retired from the telephone field.

During all this period the Western Electric Company had been steadily growing. It had taken over the eastern shops of the telephone company and by 1880 it was the largest manufacturer of electrical equipment not only in the United States but probably in the world.

The period that I have just referred to, from 1876 to 1880, [fol. 9462] was one of tremendous activity in the development of auxiliary appliances to operate with a telephone. The Bell patents covered just the telephone instruments themselves, but in order to make those useful they had to be furnished with switchboards and substation call bells and all the various instrumentalities by which connections could be made between different lines.

There were a number of companies that were making these instruments and after The American Bell Telephone Company there were a number of companies authorized and licensed to manufacture telephones for it. Among those companies were The Western Electric Manufactur-

ing Company, Charles Williams of Boston, The Gilliland Manufacturing Company and Post & Company. These various companies also manufactured different kinds of switchboards. The types were changing so rapidly that there was no permanence at all to the system that would be installed at any time by any company. The situation was such that a company purchasing a switchboard could not tell whether it could ever add to it, it might be superseded so quickly. They could not tell whether they could get parts to maintain it because they might be abandoned.

The recognition of this uncertainty led to a consolidation of the more important of these manufacturing companies. The Western Electric Company, The Western Electric Manufacturing Company, from its preeminent position in the trade, naturally became the nucleus of this group, and Charles Williams and Post & Company and Gilliland [fol. 9463] Manufacturing Company were all ultimately consolidated into a new company known as The Western Electric Company.

Q. When was that?

A. In 1881 or 1882. At that time there were about 70,000 telephones in service.

Q. In the United States?

A. In the United States; and that will show the enormous rapidity with which the new invention took hold and will give some picture of the conditions that had developed in the trade through the effects of different manufacturers making different things and abandoning them. Then there had been a tremendously active patent work. The Bell interests had had some 600 patent suits that they had fought through, and this consolidation resulted in the control of the patents of all of these companies being consolidated. The result was that the best there was in the telephone field was all made available through the one source and an arrangement with the Bell interests at that time by which these devices manufactured by The Western Electric Company would be made available to all of the licensee operating companies at prices which would be not exorbitant or unreasonable; and there was no requirement at all that the licensee should buy of The Western Electric Company, but it had to obtain its sales by making its devices attractive to them.

There were still other companies that were manufacturing switchboards and similar equipment in competition with The Western Electric Company and the licensee companies had to determine for themselves where they would buy their goods. However, the excellence of The Western Electric [fol. 9464] Company's products was so marked that the operating companies actually did buy an increasing amount of their supplies from The Western Electric Company. That condition continued for some 19 years; in other words, from 1882 to 1901, the Bell operating companies purchasing the large proportion of their apparatus from The Western Electric Company. During this same period The Western Electric Company, as a convenience to its customers, went into the business of supplying other phases of electrical supplies which were needed in connection with the instrument which they manufactured and sold. That is to say, they would purchase from other suppliers wires and crossarms and pins and insulators, whatever was necessary, and would re-sell these to the various telephone companies, and the telephone companies each had their own purchasing agent and their own supply organization. But the convenience of dealing through The Western Electric was so great that during this period of 19 years the condition developed that a large proportion of the supplies they were buying were purchased from The Western Electric Company.

So that in that year 1901 one of the Bell operating companies, which I will call now the Associated Companies, The Bell Telephone Company of Philadelphia, considered this thing in a very thorough fashion and decided that inasmuch as purchasing and warehousing was not a primary function of telephone business and as purchasing and warehousing was a primary function of The Western Electric Company, and inasmuch as most of the supplies were to [fol. 9465] be bought through The Western Electric Company any way, this Associated Company took the matter up with The Western Electric Company to the end that The Western Electric Company would agree to take over the warehousing and purchasing functions of this company. The arrangement was entered into tentatively.

The first arrangement, as I remember it, was to the effect that the cost to the telephone company that first year should not exceed the cost to them of running their own

purchasing agent and supply organization for the prior period. Then the contract went through, with several other changes, to clarify it and to make its provisions more definite, and the other Associated Companies became interested in this matter, because it was successful from the start. The Bell Telephone Company of Philadelphia found it very advantageous and as these other companies took the matter up from time to time they became parties to a similar contract, so that gradually all of the Associated Companies became parties to what is now known as the standards supply contract. The predecessor of The Ohio Bell Telephone Company, The Central Union Company, was a fairly late comer into this arrangement. Its first contract was made in 1906. That was five years after the first contract was made.

Q. Going back for a moment to the manufacturing arrangement between The American Bell Telephone Company and The Western Electric Company, you have referred to some of the reasons for the entering into of that arrange- [fol. 9466] ment, and I think you have covered the surest source of supply at reasonable prices; and you also, I believe, have referred to the fact that these so many patents owned by the different companies became merged as to ownership in the one company; what have you to say on the subject of the close adherence to specifications, electrical and mechanical, which were hoped to be secured from the combination of these companies into one company?

A. The history of The Western Electric Company guaranteed that there would be close fidelity to specifications and that matter has been of increasing importance ever since because of the desirability of the interchangeable feature in telephone plants. It is constantly being shifted. As conditions change at one particular point, a plant that is outgrown there may be useful to some other company, and unless it is possible to utilize displaced equipment and coordinate it at other places, there is a very serious loss from having to entirely discard the item.

The feature of rigid adherence to specifications is important because in engineering the plant it is possible to assign a specific electrical condition to each element, and by the summation of these elements the exact characteristics of a circuit, whether it is one mile long or five miles,

can be worked out. That could not be done unless these items were all in close agreement to the specifications.

Q. What about the coordination of new and improved apparatus with the older apparatus?

A. That is a very important feature that I should have [fol. 9467] mentioned, because the ordinary manufacturer, when he develops some new feature that he feels is of great importance, takes particular care that it will not agree with what has gone before. You see that in the automobile industry so prominently now. It is to the interests of the manufacturer from a sales standpoint to make the new replace the old. That condition was absolutely met by this general arrangement that I refer to because as the new is developed it is made to coordinate with the old. An item of improved transmission or any other benefit or improvement is especially designed so that it can be made to work with the equipment that is already in use, and in that way it is not necessary to entirely discard the old in order to get the benefits of the advance in the art.

Q. On the subject of the freedom from exploitation by patentees, tell the Commission whether or not the vesting of the ownership of these patents in one company worked to create a monopoly of the business or whether it had some other effect?

A. There was absolutely no obligation on the operating companies to buy from The Western Electric Company unless the products of The Western Electric Company were justifying their position, justifying their price. There were other companies that were in the market and could have been utilized. I am not sure that I got that question just as you wanted it.

Q. I was thinking of the freedom from exploitation by patentees which resulted from the arrangement that you have described?

A. I think the situation can be seen from this fact. A [fol. 9468] central office of any considerable size is usually placed in a building that is designed for it. The result is that if you have a certain type in your plant it is vitally necessary that that should be not only the best thing that you can get, but that you shall know that thereafter you can add to it as new developments take place. The advantages of this contract lay right along that line because they did insure a market—I do not mean a market, but a source

of supply to the telephone companies of the best there was at a reasonable price, for that was required under the first arrangement made with the company.

Mr. Dotson: May I ask a question?

Mr. Burr: I am going to ask you to refrain, if you will, and at the close of the evidence we will give you all the opportunity possible for any questions.

Q. Did the arrangement result in the reduction of costs through increased volume or otherwise?

A. Very substantially, because the fact that these items were ordered by many companies enabled them to be made in larger quantities and the prices naturally decreased with increasing volume of production.

Q. What if any effect did the arrangement have upon the certainty or ease in ordering and installing apparatus of one sort and another?

A. The fact that these items were being made absolutely according to specifications, that they were standard, would enable an interchange of employes between different companies, between different parts of the same company, so that a man ordering an article could not only be certain [fol. 9469] that he would get exactly what he ordered but that it would fit without alteration or any change into the particular board where it was to be installed, and if he required additional help from some other locality it could be furnished and these additional employes would know exactly how to go to work because of the same design and the same features.

Q. In other words, it worked not only for a standardization of apparatus but standardization of methods which could be applied interchangeably by employes of different companies; is that right?

A. Yes, sir, it is.

Mr. Dotson: Just let the witness testify.

Q. What have you to say as to the effect of the arrangement in what we will call emergency cases, if you please?

A. The Western Electric Company has always kept in its headquarters available for instant shipment items that would be necessary in the case of substantial fire damage——

Q. Substantial what?

A. Substantial fire damage; shipments ready for instant shipment, and what they could keep as manufacturers for the whole Bell System is vastly greater than what any independent company could keep for itself. That feature is true not only with regard to the items which it manufactures but also with the supplies of all kinds. For example, each Associated Company has a Western Electric distributing house that looks after its particular needs, and these distributing houses are all placed at the strategic centers of transportation. The result is that the entire United States [fol. 9470] is blocked out with some 32 of these distributing houses, each of which is carrying stock for the telephone companies.

Q. And is owned by what company?

A. They are all owned by The Western Electric company. Now the entire stock held at all of these distributing houses is available for any one company in time of emergency.

Q. Now you only mentioned the matter of fire. Is the arrangement intended to protect against other emergencies as well as fire?

A. Exactly the same thing would apply to other types of emergencies, storms, floods or similar conditions.

Q. What office does The Western Electric Company perform in connection with displaced apparatus?

A. The Western Electric Company has an arrangement with all of the Associated Companies by which items of displaced apparatus which are no longer needed in the territory where they have been in service may be returned to The Western Electric Company for credit. They are sold back to The Western Electric Company. If there is still a demand for that type of apparatus the Western Electric Company will refuild it, and that rebuilt apparatus is sold at a sacrifice figure to any company that needs the supplies. There are certain types of apparatus that ought to be returned to the factory for repairs and those types as they are released for service go back into The Western Electric Company and may be repurchased by the very company that sent them in, or any other company, at this sacrifice figure. [fol. 9471] The arrangements for this entire activity as to pricing is this, any secondhand apparatus, regardless of its condition, is still secondhand, and in order to assure a market for it the price must be an attractive price. The price of this rebuilt apparatus is placed by The Western Electric Company at about 75 per cent of the value new. That is in

spite of the fact that the apparatus itself is at least 95 per cent as good as it was originally because the wearing parts have been entirely replaced.

Now from this 75 per cent price on resale is deducted the cost of this activity, and all that is left goes to the company for that returned apparatus. In other words there is no profit at all in the transaction to the Western Company. It is done at cost. Now there is over a million dollars of transactions of this kind that are done annually through The Western Electric Company today.

Q. Coming back, if you please, to the standard supply contract of 1901 and the benefits accruing from that contract, what have you to say as to its effect upon duplicate purchasing by the warehousing organizations? You have referred to them briefly, I think.

A. Yes. The first thing that happened when any company would make its supply contract with The Western Electric Company was that they no longer needed their purchasing organization and supply organization; they were relieved of that expense. But there is a secondary consideration that is fully as important, and that was that these supply organizations were no longer competing against each other, because when the prior condition existed, and particularly in [fol. 9472] times of emergencies, these various supply and purchasing agencies would compete for the available supply and prices would naturally soar.

Q. To the benefit of what company, if any?

A. To the benefit of any outside suppliers. The arrangement of The Western Electric Company absolutely prevented any such raising of prices at times of emergency.

Q. What effect did it have upon the amount of supplies carried for the Bell System?

A. It very greatly reduced it. As a matter of fact it more than cut it in half, because the main warehouses were practically eliminated. There must always, of course, in any telephone company, be local sources of supply. Each central office needs a certain stock of supplies to handle its own work. But the main central warehouses were eliminated. And yet that feature, as I already stated, did not reduce the protection to the telephone company.

For example, The Western Electric Company has at no time within the last few years had less than $16,000,000.00 worth of supplies on hand ready for immediate shipment. Of

course no telephone company could possibly have any such volume as that available. There was a still further protection in this way, the contracts which the Western Electric Company, through the enlarged volume of purchases, were able to make for its suppliers are so advantageous to the suppliers that they are willing to do everything in their power to give The Western Electric Company proper service. I [fol. 9473] know of many cases where they have run their plants night and day to meet special and emergency situations, which they would not have done for other customers.

Q. You are referring to articles made by other than The Western Electric Company but which are purchased by the Western Electric Company for the Associated Companies?

A. Yes, sir.

Mr. Dotson: I want to object to part of the former answers in which the witness has said he has known of occasions when they would have operated day and night to take care of an emergency requirement of the Associated Companies which they would not have done for other customers. That is what I want stricken out. It seems to me that that is going into——

Mr. Burr: Do you object to the words "which they would not have done for other customers"?

Mr. Dotson. Yes, sir.

Mr. Burr: Let them go out.

Commissioner Poor: Very well.

Q. What effect did the standard supply contract have upon the standardization in supplies?

A. It had exactly the same effect that the prior arrangement had with regard to items of apparatus, because there is such an obvious advantage in having uniform supplies that would therefore permit of larger orders that that followed as a matter of course.

The engineering department of The American Telephone [fol. 9474] & Telegraph Company developed the specifications to outline the most advantageous types of supplies and those being ordered by The Western Electric Company and made available to all of the Associated Companies at attractive prices, in spite of the fact that *that* they were particularly high-grade articles, resulted in their being ordered to the exclusion of cheaper, less serviceable goods.

Q. Did it result in any improvement in purchasing methods?

A. Very much so. No one company purchasing for itself could possibly afford to have experts in each line involved, whereas The Western Electric Company, purchasing in enormous volume, is able to have experts for every single line that is in question.

Q. Now you are referring now to articles and things purchased by The Western Electric Company from other manufacturing companies?

A. Yes, sir, I am. These are things that they do not manufacture but buy on the outside.

Q. Yes.

A. What I say with regard to purchasing could just as well be taken for the things they manufacture themselves, because their experts on paper must buy paper for their factory as well as paper for their Associated Companies in their ordinary use. However, the point is that, regardless of the line, the volume is so great that The Western Electric Company can keep continuously employed in that line a man who is an expert in it. Not only that, but they have back of all of this purchasing activity and underlying it an organization known as the purchase engineer's organization, which is a statistical and engineering group of employes who make it their business to be in touch with the underlying factors [fol. 9475] of production.

As an illustration of that, take the cost of paper, which I just mentioned. News print is the type of paper that is used in our directories and we buy in it enormous volume. The principal ingredient of that is wood pulp and that in turn is bleached with sulphur bleach. Now as the prices of wood pulp and sulphur change so they must ultimately be reflected in the purchased product. This engineering organization keeps in touch with all of those underlying activities. They study each article that is to be bought to find out what are the essential elements which go into it which will be reflected in its price, and changes in conditions, and they will give their purchasing agents advance information as to the expected price change. That enables them to buy ahead of the ordinary market changes, with a judgment that simply could not be had in any other way. They do not buy just on the surface tendency. They buy on the inherent underlying tendencies in the industry.

Q. What effect has the contract had on the matter of inspection?

A. That is quite similar to the purchasing, because no one company could keep an inspector busy on his own purchases. The man would have to cover different lines. He would have to cover different factories at different places. And the result is it would be expensive in traveling and so on, and the grade of work would not be particularly high. In contrast with that The Western Electric Company can keep its inspectors engaged at the source of production [fol. 9476] continuously on the line so that their experience and knowledge of their business is always kept at top notch and the expense of the inspection if reduced to a minimum.

Q. Has the adoption of the standard supply contract had any effect upon such matters as price reduction due to increased volume of purchases?

A. Yes, sir.

Q. Or improved credit or reduction in selling expense?

A. All of those features have operated incidentally in the same direction, to reduce the prices. The volume quite obviously does that. The manufacturer is able to keep his force continually employed. He does not have to shift them from line to line. He does not have to build up his force for a peak load and then let them go after he has been to the expense of training them, but he keeps them over long periods of time steadily engaged upon the same class of production. The manufacturer under those conditions is very glad to take a lower price, because even that lower price will mean more money to him than the other way of doing business.

Similarly, selling expense is eliminated because these orders that come to him are not now the result of elaborate selling expense on his part but they come to him through the efforts, through the normal channel of the telephone company to The Western Electric Company and then to him in large volume.

And the credit of The Western Electric Company is such that all bills are discounted. There is no provision for bad debts. There doesn't have to be. In fact, the first move [fol. 9477] that The Western Electric Company makes in approaching a manufacturer who is to furnish these supplies is that he shall immediately throw off all the selling expense and all his bad debt expense, because those are taken care of and he needs no provision for that at all. And that is actually done. So that the prices are naturally lower

than they possibly could be under the arrangement of each company buying for itself under regular competitive conditions.

Q. That is, the manufacturers consider The Western Electric Company's order equivalent to the money in hand at the time of the order?

A. Yes, sir, they do.

Q. What have you to say as to the improvement, if any, in the service under the contract?

A. Well, that is a corollary of what I have already said of the amount of supplies kept on hand and on the arrangement with the manufacturers. Back of the actual stocks held in supply by The Western Electric Company itself are these arrangements with these manufacturers, that they will at times of emergencies run their plant over time, that they will build up stocks. They frequently have large stocks on hand there to back up their shipments ultimately to come to The Western Electric Company. The advantage of that is just this, the stocks that come to the telephone company from The Western Electric Company storehouses bear a warehousing charge incurred by The Western Electric Company. If they are shipped direct from the manufacturer that warehousing charge is omitted and saved. The result is, if prompt service can be given it is cheaper [fol. 9478] to get the supplies there. This statement of course assumes transportation charges are properly equalized.

Q. What have you to say as to the interchangeability of supplies and the market for overstocks under the supply contracts?

A. The conditions with regard to overstocks or extra supplies which are of the kind not made by The Western Electric Company is analagous to those which The Western Electric Company itself manufactures; that is, they may be returned to the manufacturers; and their interchangeability in times of emergency such as storm or flood is such that men can be brought in from other territories or from other companies and can immediately go to work without instruction as to the detailed handling of these particular items.

Q. Is there a difference in the matter of protection in emergencies between the plan under the present contract and that outlined by you in the previous part of your testi-

mony when you spoke of the protection against emergencies?

A. I don't think I quite understand that question.

Q. Make it this way. You referred sometime ago to the matter of protection in emergencies and at that time you were speaking more with reference to the old arrangement between The Western Electric Company and The American Telephone & Telegraph Company?

A. Yes, sir.

Q. And I am now asking whether the situation is the same or is there any difference in the matter of protection [fol. 9479] in emergencies under the supply contract?

A. The same elements of protection are increasingly present through the increasing size and facilities of The Western Electric Company and its storehouses throughout the United States.

Mr. McConnaughey: Mr. Burr, may I ask you, are you talking about two different contracts here in different parts of this testimony?

Mr. Burr: No; in the earlier part we were talking about the old arrangement between The American Bell Telephone Company and The Western Electric Company which existed prior to the supply contract of 1901. Then I called the witness' attention to that contract and for some time he has been discussing advantages arising under that contract.

Q. There are one or two other things I wanted to ask you about that contract, Mr. Cox, and one is this; what effect, if any, has it had upon the obsolescense losses?

A. The effect on obsolescence losses is to reduce them in two ways. The effect, however, is much more noticeable in connection with apparatus than it would be in connection with supplies not made by The Western Electric Company. In case of apparatus obsolescence is minimized because the new and improved article is made to coordinate with the old that is already in service so that it does not have to be displaced. And on the other hand, when the time comes when it must be replaced, whatever salvage value there is available to it can be realized by that company or any other [fol. 9480] company that has need of it.

Q. I think you have already explained about the increased sources of supply which are available as the result of the arrangement. You will have some exhibits at a later point

showing how those supplies have been made available to different localities in emergencies?

A. Yes, sir, I will.

Q. Tell the Commission whether or not The Ohio Bell Telephone Company purchases from The Western Electric Company under a standard supply contract such as the one you have been describing generally?

A. Yes, sir, it does. In common with all of the other Associated Companies they have signed identical contracts.

Q. Do you remember when the contractual relationship between The Western Electric Company and The Bell Company operating in Ohio began?

A. That was in 1906.

Q. That was the contract between what companies?

A. Between The Central Union Telephone Company and The Western Electric Company.

Q. Has there been any change in the contract since that date?

A. There have been changes in *u*ts phrasing. It has been expanded and clarified and there have been some changes in the rates of remuneration to The Western Electric Company.

Q. Are you familiar with the contract under which The Ohio Bell Company is now making its purchases from the Western Electric Company?

A. Yes, sir, I am.

Q. Look at the compilation marked Standard supply [fol. 9481] contract and supplemental agreements between The Western Electric Company Inc. and the Associated Bell Companies and which, in the first page, purports to be the standard supply contract between The Western Electric Company and The Ohio Bell Company and tell the Commission whether or not that is an exact copy of the contract referred to?

A. Yes, sir, it is.

Mr. Burr: It may be marked for identification Cox Exhibit No. 1, and is offered in evidence.

And thereupon the Document above referred to was marked for purposes of Identification as Cox Exhibit No. 1 and was offered and admitted in evidence on behalf of The Ohio Bell Telephone Company and is herewith submitted and made a part hereof.

Q. Will you explain the working of this contract, Mr. Cox?

A. Briefly, this contract, first of all, provides that The Western Electric Company shall maintain store rooms and stocks for the particular benefit of the Associated Companies. Now the store room for this company is located in Cleveland.

Q. By this company you mean The——

A. Ohio Bell Telephone Company.

Q. Yes.

A. The next feature is that there is a division made between items which The Western Electric Company makes itself and those which it does not make but must purchase from some other suppliers. Sections 2 and 3 refer to this [fol. 9482] second group, those items which The Western Electric Company does not make. Now with regard to that group the provision of the contract is that the basic price to The Ohio Bell Telephone Company shall be net cost to The Western Electric Company. And net cost here is defined as the price after all discounts, allowances and commissions have been deducted.

Mr. Dotson: Where is that to be found?

The Witness: That is in Section 3, in the indented section.

Mr. Burr: Page 1.

The Witness: Page 1. Now, to these net prices there is added a service charge to compensate The Western Electric Company for the expense of purchasing, paying transportation on these articles, adjusting claims in connection therewith, storing, delivering and so on. That schedule of remuneration rates is defined in a subcontract which will be found headed Section 3 a little bit further on in the contract in its proper numerical order.

Mr. Burr: I would like to have it understood that not only the contract but the supplementary agreements which appear under the same cover and include Sections 3 to 7g inclusive are a part of Cox Exhibit No. 1.

Mr. McConnaughey: How about Sections 1 and 2?

Mr. Burr: 1 to 7g inclusive.

The Witness: The remuneration rates provided for items which The Western Electric Company does not manufacture but buys from some other supplier are shown in this [fol. 9483] subcontract covering Section 3, and, as you will observe here, they are dependent in their amount upon

whether the item is shipped direct from the manufacturer or whether the item is warehoused by The Western Electric Company. They are also dependent on the character of the item itself, because it is quite obvious that such a commodity as hard-drawn copper wire, which is almost invariably furnished in full coils, does not need as high a rate of remuneration as would apply on items of stationery which may be distributed a half dozen blotters at a time. So that there are these percentages for various classes and conditions, all based, however, on the net cost to the Western Electric.

Q. The net cost for this apparatus?

A. The net cost of supplies. That is what they have to pay the manufacturer.

Now coming to Section 4 of the main contract; on the first sheet of the contract we find that there are no obligations on the telephone company to purchase any article manufactured by the Electric Company. That is not only written in here in the contract but it is followed out to such an extent that while I don't know the exact amounts that are purchased for this company outside of the contract, I assume from analogy with other contracts it is about 10 to 20 per cent of the items which they purchase, because for those items it is possible for you to get just as good a price as The Western Electric Company could itself, because these are not items of such a nature as to permit national contracts from mill points. They may be small in volume or [fol. 9484] for some other reason they are not subject to grouping, and in that way The Western Electric Company cannot obtain any lower price than any other company can.

Q. If an Associated Company, such as The Ohio Bell Company, purchases apparatus under Section 4 from some other company than The Western Electric, does The Western Electric receive any payment or consideration of any kind on that account?

A. No, sir, not any.

Q. Very well.

A. Now, of the articles which The Western Electric Company makes itself, and those are all classed here as apparatus, the arrangement is that the telephone company is given the most favored customer price, and that is one of the obligations of the contract that I specially devote my own activities to ascertaining — actually is followed out.

The next important question under the contract is Section 7. That outlines a group of special services which

will be contracted for if the telephone company so desires, and as a matter of fact have all been contracted for by this company. For example, 7a covers the receiving, classifying, storing, issuing, carrying investment in or reissuing or disposing of any apparatus or supplies returned by the telephone company. That will be found covered by a special supplementary contract under 7a. Similarly on these other special services.

Q. You have heretofore referred to apparatus which might be returned under this clause before you?

A. Yes, sir, I have partially referred to that very pro- [fol. 9485] cedure. Now I do not think it is necessary at this time unless you desire it to go into further detail into the divisions of this contract, for those that have been brought out are the important phases of it. I might say that the compensation to The Western Electric Company for these special services is in very small proportion to the payments that they get for the direct sales of supplies of their own manufacture and the amount that they receive as representing the cost to them of supplies which they buy from other concerns. The bulk of the money represented by the contract is under those two divisions, not under special services.

Q. Will you give one or two examples showing that the Ohio Bell Company does not buy all of its supplies through The Western Electric Company?

A. Supplies that are purchased under emergency conditions. If a certain piece of work were required in some definite point from The Western Electric Company storehouse and it involved lumber or any supplies that were locally available, why, it would be manifestly uneconomical to buy this through The Western Electric Company, and they are just bought locally, building material, sand, stone, cement or building equipment house service supplies—by that I mean supplies that are required in the maintenance of engines and elevators and things like that—to some extent furniture—I don't know just to what extent in this company, but most of the companies have a considerable amount of special furniture which they do not buy from The Western Electric Company although certain standard lines are made available because office furniture can be [fol. 9486] obtained economically under national contracts

along certain definite lines. Automobile supplies, another very large item, for instance, tires; the tire is subject to deterioration in stock and The Western Electric Company does not stock tires. It would not be economical to the telephone companies if they did. So that those are generally purchased direct. Various items of stationery and special printing. Rest and lunch room supplies. And I think quite possibly different types of automobiles. There are some automobiles where The Western Electric Company has a national contract. There are others where there has not been a sufficient volume yet shown to justify a national contract, and if any company wants an automobile of that type, as I haven't any doubt that the Ohio Telephone Company has, they undoubtedly buy it direct without any relation to The Western Electric Company.

Q. Do you know of apparatus made by other companies than The Western Electric Company and which has been or is being purchased by The Ohio Bell Company notwithstanding similar apparatus is made by The Western Electric Company?

A. May I have that question again?

Mr. Burr: Read it. It is rather involved.

(Question read.)

A. I do know that in other years, I think it was only last year, certainly the year before, there were large purchases made by The Ohio Bell Telephone Company of equipment of concerns other than The Western Electric Company for strictly telephone purposes.

Mr. Burr: We won't go into that here because it has [fol. 9487] already been covered by another witness.

Mr. Dotson: I think then you better strike out what the witness says, because the statement as it now stands is quite broad and sweeping and yet it does not refer to a single definite thing and it gives you the benefit of that statement and puts us to a tremendous disadvantage. If he is not to testify to that, that ought to go out.

Mr. Burr: I think you will survive the disadvantage, Mr. Dotson.

Mr. Dotson: Well, I may lose some sleep and some appetite and I don't want to lose either. I think it ought

to go out in all fairness unless you want to pursue it. It is a statement of conclusion.

Mr. Burr: It is a question of fact.

(Question and answer read.)

Mr. Dotson: He could have answered that amply either yes or no.

Commissioner Maullar: Haven't you some——

Mr. Burr: We have specified several respects in which that is true, Your Honor, and I was merely asking for a general answer without taking up the time to go into detail again.

Commissioner Maullar: Can't the witness briefly state some of the things that were purchased?

Mr. Dotson: Mr. Burr is relying now upon the testimony of another witness. He says so. So why have anything from this witness on that point?

[fol. 9488] Mr. Burr: Isn't there such a thing as cumulative evidence?

Mr. Dotson: Yes, and it is objectionable when it is cumulated in this way.

Commissioner Maullar: I think this witness, if he knows of some purchase—the statement possibly that the purchases were made of that class of property is proper, but he might further detail it by stating a few of the things purchased.

Q. Can you specify some of the things so purchased?

A. I cannot put it in just that form, but I can state this, that two years ago I made a special inquiry along that line of The Ohio Bell Telephone Company and—that is, if it is proper—I was informed by the general auditor of the total amount of those special purchases, and as I recall the figure it was in the neighborhood of at least $50,000.00. It certainly was not less than that, probably a great deal more than that.

Mr. Dotson: We move to strike out the answer as it is based entirely on the statement of somebody else which is purely hearsay as a matter of fact.

Mr. Burr: It may go out.

Q. Do you know whether there are any other companies not controlled by The American Telephone & Telegraph

Company which operate under a standard supply contract or contracts similar to Cox Exhibit No. 1?

Mr. McConnaughey: I object.

Mr. Dotson: With whom, standard contract with [fol. 9489] whom?

Mr. Burr: With The Western Electric Company.

Mr. Laylin: That is objectionable.

Mr. Dotson: It is wholly immaterial.

Mr. Burr: It is very material because it shows that companies other than those controlled by The American Company consider the arrangement of sufficient value to avail themselves of it. There could not be any better evidence of the value of this contract than that.

Mr. Dotson: Why, Mr. Burr, I am surprised to hear that remark. There could not be better evidence! Why, there isn't any evidence as good as this contract, if it has any merit at all. Some other contract does not supply any merit to this contract.

Commissioner Maullar: I think the objection is well taken because you have no way of showing what it was that induced the other company to enter into the contract.

Mr. Burr: Let the record show that the witness, if permitted to answer, would say: "Yes, the Southern New England Telephone Company and The Cincinnati & Suburban Bell Telephone Company". Note our exception to the Commission's ruling.

Q. What class of commodities does The Western Electric Company sell and to what class of customers, if you know?

A. It has two major classes of commodities which it sells, those which it makes itself and those which it does not make. [fol. 9490] Now, of those which it makes itself they relate exclusively to the telephone business. You may see certain devices for household use, such as washing machines and so on, that bear The Western Electric Company name. However, those are not made by The Western Electric Company. Its entire manufacturing facilities are devoted to telephone supplies. Now that is one class. The other class is items which it buys and resells. Its classes of customers are several. It deals with the Associated Companies and it also sells in the general trade.

Q. To other telephone companies?

A. To other telephone companies and the United States Government, various domestic customers of all kinds who are interested in supplies that have relation to telephone work and similar electrical lines.

Q. Without going into the entire field, because it is a very large one, tell the Commission some of the articles which The Western Electric Company does not manufacture but purchases and resells either to the Associated Companies or others?

A. The items which it does not make are those which can be obtained from other manufacturers of satisfactory quality and at a satisfactory price. Those are all forms of pole line hardware, crossarms, braces and poles themselves, and crossarms and insulators and pins, items for which it is able to contract with the general manufacturing facilities of the country. The items which it makes itself are those where there is some inherent need of special accuracy or special skill, something which relates intimately to the giv- [fol. 9491] ing of telephone service. Those are largely patented devices.

Q. In purchasing supplies not manufactured by it does The Western Electric Company confine itself to isolated purchases or separate orders from an Associated Company or Associated Companies, or does it purchase in bulk?

A. The arrangements in general are these, each Associated Company prior to the first of the year has prepared an outline of the program which it proposes to conduct during the succeeding year. That is reduced to terms of material and The Western Electric Company is informed as to the amount of purchases which will come to it from these different sources. The Western Electric Company then arranges for the manufacturing facilities necessary to produce that volume of supplies at the times which it will be needed during the year. There are a series of reports which are made to The Western Electric Company to enable it to coordinate its supplies with the manufacturing program, so that the contracts which are made as a result of this information by The Western Electric Company are made on a national basis under competitive bidding for as long a term ahead as the conditions of the market will justify.

Q. Under competitive bidding by whom?

A. Competitive bidding of the suppliers of such calibre

that their product can reasonably be held to meet the requirements; that is, they can have confidence in advance that they will deliver under the contract.

Q. Have you prepared a statement showing the volume of the business of The Western Electric Company and [fol. 9492] how this volume is divided by classes of customers and classes of merchandise?

A. Yes, sir.

Mr. Burr: It may be marked Cox Exhibit No. 2 and is offered in evidence.

And thereupon the document above referred to was marked for purposes of identification as Cox Exhibit No. 2 and was offered and admitted in evidence on behalf of The Ohio Bell Telephone Company and is herewith submitted and made part hereof.

Q. Will you briefly outline the key to the exhibit?

A. This exhibit shows the total sales of The Western Electric Company, Incorporated, for each of the years 1918 to 1923 inclusive, and it divides these sales by classes of customers between Associated Companies and all others and it subdivides also by classes of merchandise, showing that which it manufactures itself, which is here designated W. E. merchandise, and that which it does not manufacture itself, which is here designated Merchandise not Western Electric.

Just to take one year as illustrative of the situation, for the year 1923, at the foot of the form, we have that The Western Electric Company sold of merchandise of its own manufacture to the Associated Companies $130,734,554.00, which represented 91 per cent of the total sales of its own merchandise. They sold to all others $12,908,936.00, which represented 9 per cent of their total manufactures; mak- [fol. 9493] ing a grand total of $143,643,490.00 of supplies made by them.

Now of merchandise not manufactured by The Western Electric Company it sold to the Associated Companies $55,234,303.00, representing 50 per cent of that classification, and the other 50 per cent was sold to others, as naturally follows.

Q. Have you information as to the total business in telephone supplies in the United States other than that of the Associated Companies; that is to say, that sold to the general trade?

A. Yes, sir, I have. The Western Electric Company sells supplies of its own make and supplies not of its own make in the general trade in competition with other supplies. Now of the total amount sold in the general trade by suppliers The Western Electric Company sells approximately 20 per cent of the apparatus, 40 per cent of the lead covered cable and 15 per cent of supplies not manufactured by The Western Electric Company, that grand total equalling something between 80 and 100 million dollars.

Mr. McConnaughey: That is what The Western Electric Company sells?

The Witness: No, that is the grand total sold by all concerns that are dealing with supplies that are of a nature to be used in the telephone industry.

Mr. McConnaughey: And of that 80 to 100 million The Western Electric Company sells 20 per cent of the apparatus that is included in that?

[fol. 9494] The Witness: Yes, sir.

Mr. McConnaughey: 40 per cent of the lead sheathed cable?

The Witness: Yes, sir.

Mr. McConnaughey: And 15 per cent of all the other you mention?

The Witness: Yes, sir.

Mr. McConnaughey: Can you tell what proportion of the 80 to 100 million that 20 per cent of the apparatus is?

The Witness: Yes, sir; it would be something like this; about 20 millions of apparatus and 3 millions of lead covered cable and say 70 million of other supplies—60 million, we will say, of other supplies.

Q. Are there included in this 80 to 100 million of supplies any supplies sold to the Associated Companies?

A. No, sir. I will have to qualify that, because there is in this way. Some of these independent manufacturers are selling supplies to The Western Electric Company for use by the Associated Companies and that is included in here. In other words, I have taken their output, taken the independent companies, the independent manufacturing companies' output, as it is, even though it may be some of it got into the use of the Associated Companies.

Q. What are the principal companies, if you know, which compete with The Western Electric Company in the sale of telephone apparatus to the general trade?

A. Those are principally the Kellogg Switchboard & [fol. 9495] Supply Company in Chicago and the Stromberg-Carlson Manufacturing Company of Rochester, New York.

Q. Do you know the prices charged by those companies?

A. Yes, sir, I do.

Q. How do you obtain them?

A. Both of these companies send me their catalogues, price sheets and discount sheets direct. That comes about from the fact that our companies buy more or less apparatus of these two companies and many of the sub-companies also buy from them and their catalogues and price list are available through all of these sources. As a matter of fact I get them direct.

Q. How often do you get them?

A. By applying for them.

Q. I mean how soon with reference to the date of their issue?

A. I have every reason to believe that I get them immediately. I am on their mailing list and they come promptly after the date they become effective.

Q. Have you made a study of the prices charged by The Western Electric Company in the open market and the competing prices of the other companies which you just mentioned?

A. Yes, sir, I have.

Q. Are the results of that study in the form of a chart?

A. Yes, sir.

Q. Who prepared it?

A. I did, or under my personal direction.

Mr. Burr: The chart may be marked Cox Exhibit No. 3 and is offered in evidence.

[fol. 9496] And thereupon the Chart above referred to was marked for purposes of identification as Cox Exhibit No. 3 and was offered and admitted in evidence on behalf of The Ohio Bell Telephone Company and is herewith submitted and made part hereof.

Q. Explain the chart, if you please?

A. This chart compares the prices of The Western Electric Company, The Kellogg Company and The Stromberg Company in the general trade over a period of years. It is prepared in this way. It represents first of all a fixed bill of goods. In preparing that bill of goods, please turn to

Sheet 2 of the Exhibit, you will see there in the lefthand column, under the heading "Western Electric Company, Incorporated", the sub heading, "General Trade". That is Column B, a list of items of telephone apparatus. Now those items—there are altogether 79 of them—were selected in this way. They represent first of all all of the important classes of telephone apparatus and they also represent leaders in those classes so that they are representative of the entire range of telephone apparatus manufactured by The Western Electric Company and sold to the general trade, and also sold to the Associated Companies. Now that list of items is also shown on the next page of the exhibit.

Q. That is Page 3?

A. You will find them listed under Column A of the third page of the exhibit. Now the next column shows the approximate total sales for the year 1922 which were made to [fol. 9497] the Associated Companies of this list of supplies.

Q. You are still referring to Page 3?

A. This is on Page 3, yes, sir. The subsequent columns represent a series of dates, January and July 1st for each year in succession, and this fixed bill of goods represented by these items and these quantities is priced as of these dates at the prices ruling at that period, at that time. The summation of these various columns shows the total of the bill and that is brought over on the first page of the exhibit under The Western Electric Company Incorporated and the corresponding date. Now the prices for the other two companies are obtained in exactly the same way.

Q. Where is it shown?

A. Refer back now to Page 2 of the exhibit. We have posted any item in Column B showing the Western Electric name the corresponding item supplied by the Kellogg Company; that is shown under Column C. Now these items, these substantially competing items were all designated to me by our engineering department without knowledge of what the prices were, simply with the requirements that they give the closest equivalent without unfairness to the independent manufacturing companies.

You have, therefore, in Column C the list of Kellogg items. And the same quantities that were used for the Western Electric prices and that in the fixed bill of goods is priced under the same dates in accordance with the prices of the Kellogg Company ruling as of those dates. Again

we take the summation of these prices for the different dates and carry them over onto the first sheet. The Strom-
[fol. 9498] berg-Carlson prices were obtained in the same way. So that we have at the foot of Sheet 1 a statement showing as of any particular date a comparable price for the same bill of goods as furnished by The Western Electric Company, the Kellogg Company and the Stromberg Company in the general trade.

The top of the first sheet shows prices in graph form.

Q. And shows the Western Electric prices generally higher than those of the other two companies?

A. Yes, sir, the Western Electric Company has been higher for the majority of the time.

Q. Going back to Page 2, I notice in Column A is a condenser No. 21D, and in Column C is condenser No. 16. Are those designations designations respectively of Western Electric and the Kellogg Company?

A. Yes, sir.

Q. It does not mean they are different kinds of articles but merely different designations used by the two companies for their own purposes?

A. Yes, sir, although the article itself is a substantial equivalent, it is not the identical article, as two pencils would be.

Q. But one is as nearly an equivalent of the other as is manufactured by the two companies respectively?

A. Yes, sir.

Mr. Burr: Let it be understood that Cox Exhibit No. 3 includes five pages, which may be marked pages 1, 2, 3, 4 and 5.

Q. Does the Western Electric Company make the same
[fol. 9499] charges to the Associated Companies that it does to the general trade for telephone apparatus?

A. No, sir. The prices to the Associated Companies are very much less than they are to the general trade.

Q. Have you made a study of the charges by The Western Electric Company to the Associated Companies?

A. Yes, sir, I have.

Q. Have you shown it so as to make a comparison between those charges and what the charges would have been for items and quantities as of the dates given in Exhibit 3?

A. Yes, sir.

Q. Is the chart marked Cox Exhibit No. 4, and consisting of a graph and a tabulation of figures marked Sheet 1 and a page containing columns of figures and a column of designations marked Sheet 2, the statement to which you refer?

A. Yes, sir, it is.

Mr. Burr: We offer Cox Exhibit No. 4 in evidence.

And thereupon the Document above referred to was marked for purposes of Indentification as Cox Exhibit No. 4 and was offered and admitted in evidence on behalf of The Ohio Bell Telephone Company and is herewith submitted and made part hereof.

Q. Explain this comparison, if you please?

A. The first sheet of this exhibit reproduces all of the first sheet of Exhibit 3 and adds to it the prices to the [fol. 9500] Associated Companies for the same fixed bill of goods under the same series of dates, the prices to the Associated Companies being given in the first column.

Q. To what bill of goods are you referring?

A. The same bill of goods that was given in Exhibit 3. It will be seen from this exhibit with the prices to the general trade by the Western Electric Company that the other competing manufacturers are very substantially higher over this entire period than are the prices of The Western Electric to the Associated Companies.

Q. When you refer to the bill of goods shown in Exhibit No. 3 you do not mean, do you, that the figures on pages 2, 3, 4 and 5 of that exhibit represent a single bill of goods ordered at one particular time?

A. No, sir, but as of any date, the same series of articles and quantities has been taken.

Q. Naturally he who runs may read, Mr. Cox, but in order to save some possibly close reading of these numerous figures, I will ask you whether or not the articles described in the first column on the lefthand side of Sheet No. 2 of Cox Exhibit No. 4 are the same as those described in the lefthand column of Page 2 of Exhibit 3?

A. Yes, sir they are identical.

Q. How nearly does Exhibit 4 reflect the price levels for all periods used by the Associated Companies, including the Ohio Bell Company?

A. It does very nearly because as the prices of these items rise and fall, so the prices of the related items in their

[fol. 9501] classes rise and fall. It will be the same not only for the Western Electric Company but for the other companies.

Q. And you have stated that The Western Electric Company uses two price lists, one for the general trade and one for the Associated Companies. Have you made a comparison of those two price lists?

A. Yes, sir, I have.

Q. Is it in statement form?

A. Yes, sir, it is.

Mr. Burr: The statement may be marked Cox Exhibit No. 5, Sheets 1 to 10 inclusive, and is offered in evidence.

And thereupon the document above referred to was marked for purposes of Identification as Cox Exhibit No. 5 and was offered and admitted in evidence on behalf of The Ohio Bell Telephone Company and is herewith submitted and made part hereof.

Q. Explain the exhibit?

A. The Western Electric Company sells items of telephone apparatus to the Associated Companies and also to the general trade.

Q. That is apparatus of its own manufacture?

A. Yes, sir, apparatus of its own manufacture, and it issues separate price lists for these two classes of customers. The price list to the Associated Companies is much larger because it contains a lot of items that are not sold to the general trade but reserved exclusively for the use of the Associated Companies. However, to the extent that there are common items on these two price lists they have all [fol. 9502] been compared as of the price lists in effect January 1st, 1924, and they are shown on this exhibit and the ten sheets comprising it. In each case the difference between the two sets of prices is determined for any article and then the percentage by which the price to the general trade is higher is determined.

Now the average situation disclosed by the entire exhibit shows that the prices to the general trade are 41.27 per cent higher on the average. However, the lowest differential existing in the entire list was 23.19 per cent higher than the price to the Associated Companies.

Q. That is, the price to the general trade was that much higher?

A. The price to the general trade was that much higher.

Q. What was the highest?

A. The highest was 400 per cent. Now there is one further point I wish to bring out here. The Associated Companies get the lowest price regardless of the quantities they use. If they purchase one of an item they would get exactly the same price as though they purchased the maximum quantities. That is not the case in pricing to the general trade.

Q. What is the case there?

A. Because there the pricing follows the normal for wholesale quantities and the pricing I have used in this exhibit is the lowest quoted price for the maximum quantity. In other words, if less than maximum quantity has been ordered the differentials would be higher than those shown here in this summary.

Q. What prices do you use for the general trade in Ex-
[fol. 9503] hibit 5?

A. I have taken in every case the price with the maximum discount off allowed.

Q. Under that arrangement unless the purchases by the general trade are in wholesale quantities what would be the effect of the differential in favor of the Associated Companies?

A. It would be higher than shown on this exhibit.

Q. Have you prepared a statement showing the sales by The Western Electric Company of telephone apparatus to the general trade since the year 1911?

A. Yes, sir, I have.

Q. Does that show the differentials between the price to the general trade and the price to the Associated Companies over that period?

A. Yes, sir.

Mr. Burr: It may be marked Cox Exhibit No. 6. It consists of one sheet. We offer Exhibit No. 6 in evidence.

And thereupon the document last above referred to was marked for purposes of identification as Cox Exhibit No. 6 and was offered and admitted in evidence on behalf of The Ohio Bell Telephone Company and is herewith submitted and made part hereof.

Q. How did you go at the preparation of this exhibit?

A. This exhibit shows for this series of years 1911 to

1923 the total actual sales to non-contract customers, that is, those which have not the benefit of the supply contract, [fol. 9504] and the amount of the sales for each year is shown in Column 2 at the foot of the form. Had those sales been made to the Associated Companies on the basis of the supply contract the amounts would have been as shown in Column 3 at the foot of the form. You will notice that in every case Column 3 is lower than column 2, and the amount of that difference is shown in percentage in the last column at the foot of the form, the last column to the right, the differential for the year 1923 having been 30 per cent.

Now the two studies of prices are completed in graph form at the top of the form. The upper line in the x'd area is the price for the general trade and the line immediately below it represents what the price would have been had the sales been made to the Associated Companies of the identical items and quantities.

Q. Does The Western Electric Company sell lead covered cable, underground and aerial cable to the general trade as well as to the Associated Companies?

A. Yes, sir, it does.

Q. How are those sales priced?

A. The prices to the Associated Companies are based on a price list and those to the general trade on the basis of quotations as the inquiry is made.

Q. What is the basis of the prices to the Associated Companies?

A. It is the most favored customer price.

Q. Have you prepared a statement showing the sales by [fol. 9505] The Western Electric Company of lead covered cable to the general trade since the year 1921 and what the differential between the price to the Associated Companies and the general trade has been?

A. Yes, sir, I have.

Mr. Burr: It may be marked for Identification Cox Exhibit No. 7 and is offered in evidence.

And thereupon the document above referred to was marked for purposes of Identification as Cox Exhibit No. 7 and was offered and admitted in evidence on behalf of The Ohio Bell Telephone Company and is herewith submitted and made part hereof.

Q. How did you prepare that exhibit?

A. This exhibit is entirely similar to Exhibit 6. In fact, it shows the actual prices which were charged to the non-contract customers and then the prices which the Associated Companies would have had to pay on the basis of the supply contract had they made the identical purchases. The price to the Associated Companies is substantially less and the differential for the year 1923 is shown to have been 17 per cent in favor of the Associated Companies.

Q. Do the Associated Companies, including the Ohio Bell Company, buy all of their lead covered cable from The Western Electric Company?

A. No, sir, they do not. It happens that there is a shortage of lead covered cable today, owing to the unprecedented demands of the Bell Companies and the fact that The Western Electric Company is erecting a new cable factory which [fol. 9506] will not be in operation until the latter part of this year. The New England Telephone & Telegraph Company is getting its proportion of the Bell System product but in order to expedite some of its program it is also purchasing cable from an independent manufacturer which is located in its own district, located near Providence, Rhode Island, and it is making substantial purchases and has for the last year from that company.

Q. That is The American Electrical Works?

A. The American Electrical Works, yes, sir. I have here a bill showing the situation with respect to those prices.

Q. How do they compare with the Western Electric prices?

A. They are substantially higher. For example, a contract placed under date of January 17th called for 251,500 feet of cable and the price for that f. o. b. Providence was $51,086.00. Had the Western Electric Company furnished that cable the price would have been $48,405.00 showing an increase to the American Electrical Works of 15.6 per cent.

An order placed on January 29th, 1924, calls for 308,857 feet. The price of that f. o. b. Providence was $74,821.00, and the corresponding Western Electric price would have been $59,908.00, showing an increase to the American Electrical Works of 24.89 per cent.

Q. Does the Western Electric Company sell supplies not of its own manufacture to both the Associated Companies and the general trade?

A. Yes, sir.

Q. You have already referred to that once, but I want [fol. 9507] to ask you whether there is any difference in the grade of those supplies sold to those two different classes of customers?

A. Yes, sir, there is. The Associated Companies purchase almost exclusively what is known as the specification grade. That is the grade corresponding to the specifications of the General Staff of The American Telephone & Telegraph Company. They buy that grade because there is the value there. It is just the difference between a long fibre wool coat and a shoddy coat. Now the general trade does not as a rule purchase that grade. They purchase a commercial article not as good, and these two articles are furnished by The Western Electric Company to its two classes of customers.

Q. I suppose companies other than the Associated Companies may buy according to the same specifications as those of the American Company, may they not?

A. Yes, sir, or the Associated Companies could buy of the cheaper commercial grade if they so desired.

Q. But in the latter case they do not?

A. But they do not care to do it because they do not get as much for their money.

Q. Have you made a study of the prices of The Western Electric Company for these two grades of supplies to the Associated Companies and to the general trade respectively?

A. Yes, sir.

Mr. Burr: It may be marked Cox Exhibit No. 8 and is offered in evidence.

[fol. 9508] And thereupon the document above referred to was marked for purposes of identification as Cox Exhibit No. 8 and was offered and admitted in evidence on behalf of The Ohio Bell Telephone Company and is herewith submitted and made part hereof.

Q. What is the basis for the comparison?

A. Now this exhibit outlines a number of different articles of this general class, and just to take the first mentioned article as an illustration, we have on the top line Bolts carried 3/8 by 4 inches, galvanized specification L3080.

Q. Whose supecification is that?

A. That is of The American Telephone & Telegraph Company, and the unit price of those is based on a 100 basis, and the price to the Associated Companies f. o. b. the Cleveland warehouse is $1.37.

Now the next line shows the commercial article bearing the same name but not of the specification grade and that is sold by The Western Electric Company in the general trade for $1.76. In other words, the Associated Companies get a better article for a price lower than the inferior article as sold in the general trade. And the same general situation exists throughout the system.

There are cases where the contrary is true. For example, take brackets, creosoted oak. You will notice the price under the specification is higher than the price to the general trade. In this case there is a very substantial difference in the quality. The general trade article represents [fol. 9509] the rejects and the culls from the specification product.

Q. What about the clamps shown in the next classification?

A. The same general condition is true of the clamps. The price to the Associated Companies for the specification article is higher than to the general trade but the general trade article has not the holding power nor has it got the same protection against rust because the galvanizing is inferior.

Q. What about the items of crossarms indicated by a d in parenthesis?

A. The Ranier grade arm is recognized as a cheaper arm by all suppliers. If the Associated Companies wish to buy these articles that are of the commercial grade and sold at a lower price in the general trade, the price to them would be substantially lower than that shown in Column D of this statement, but it is not to their interest to do it because they do not get the same value for their money.

Q. What about pins designated by E in parenthesis in the right hand column of figures?

A. Pins is another example of articles to the general trade, representing a large proportion of the rejects from the sepcification grade. The thread to take the insulator on these pins is very apt to be broken in the turning process and the American specifications are very rigid as to the application of those screw threads. The rejection is high and those come into this commercial grade, and the wood is in-

ferior too in the kind made up for the strictly commercial grade.

[fol. 9510] Q. In the case of rods, designated by F in parenthesis, in the righthand column of figures, what is there peculiar to that classification?

A. These are guy rods and the specification article is equipped with a special eye which makes the use of a thimble unnecessary. Rods sold to the general trade have the ordinary eye and a thimble is necessary and that naturally makes an additional cost to supply thimbles, but there is some danger of injuries in placing guys of that kind.

Q. You call them thimble guy rods in both cases notwithstanding the Associated Company article does not have thimbles?

A. That is a fact.

Q. Do the Associated Companies, including the Ohio Bell, buy from The Western Electric any class of merchandise not made by The Western Electric of a strictly commercial grade?

A. Yes, sir, it does.

Q. For example?

A. Well, stationery is a very good example of that.

Q. Is that a typical example?

A. Yes sir, it is. Everybody is familiar with stationery and it is used by all offices and it does not enter into service in the sense that one grade would give better transmission of conversations than the other. It is a totally different commodity.

Q. Have you made a study of the prices charged by The Western Electric Company for stationery in comparison with local quotations from wholesale dealers at the headquarters of The Ohio Bell Company?

A. Yes, sir, I have.

[fol. 9511] Do you refer to the exhibit marked for identification Cox Exhibit No. 9, Sheets 1 and 2?

A. Yes, sir.

Mr. Burr: We offer Cox Exhibit No. 9, Sheets 1 and 2, in evidence.

And thereupon the document above referred to was marked for purposes of identification as Cox Exhibit No. 9 and was offered and admitted in evidence on behalf of The Ohio Bell Telephone Company and is herewith submitted and made part hereof.

Q. Tell the Commission what you did in connection with the preparation of this Exhibit?

A. There are certain items of stationery which are used by all of the Associated Companies and are of such a nature as that the requirements for all can be combined and The Western Electric Company can go directly to manufacturers and make national contracts for this combined requirement. The items of this character which are used by The Ohio Bell Telephone Company are listed in this exhibit, and to see the effect of purchasing under this national contract basis as against purchasing on a local basis, I had the superintendent of supplies of an Ohio Bell Company write to four of the largest wholesalers in this line in the City of Cleveland, submitting this list and submitting the quantities, which represent a year's supply, and ask for their bids on that basis.

[fol. 9512] Q. Does Exhibit No. 9 cover a year's supply?

A. Yes, sir.

Q. Go ahead.

A. The lowest quotation from any of these four, from all of the four, is entered under Column C, and the amount of that price applied against the quantity as shown in Column D. Now the prices which the Western Electric Company had to pay its suppliers for these items is shown in Column E, and the amount extended against the quantity as shown in Column F. However, there must be paid by the Ohio Company to the Western Company a service charge for handling these purchases. That is applied here in summary at the foot of the form.

Q. Page 2?

A. That is on 2. You have the total of the two studies of quotations at the foot of the column, as follows:

You have, representing the lowest wholesale quotation, a total of $28,194.81, and the total of The Western Electric Company price $20,632.59.

Now to the Western Electric price must be added its remuneration at 10 per cent. The amount of that is $2063.26.

If the Ohio Company was not purchasing these supplies through The Western Electric Company but was purchasing them direct, it would incur expenses in doing so of warehousing and purchasing. I have taken the amount of expense in that connection as identical with that which it pays the Western Electric Company. Making these two additions we can get the total cost had the purchases been

[fol. 9513] made locally of $30,258.07, and the cost through the Western Electric Company would be $23,256.33.

Q. The cost to or the cost through?

A. The cost through the Western Electric Company.

Q. Yes.

A. That means an increase of $7,000.00 over the Western Electric Company if the purchases had been made locally and represents a 30 per cent increase. Now that is typical of the value of this wholesale purchasing by going direct and making those on national contracts.

Q. Have you made studies to determine for a period what the actual costs were to an Associated Company for telephone apparatus and lead covered cables purchased from The Western Electric Company as against what the cost would have been if similar purchases had been made from other suppliers?

A. Yes, sir, I have.

Q. Is one of the studies shown in Cox Exhibit No. 10, Sheets 1 to 5 inclusive?

A. Yes, sir.

Mr. Burr: We offer it in evidence.

And thereupon the document above referred to was marked for purposes of identification Cox Exhibit No. 10, Sheets 1 to 5 inclusive, and was offered and admitted in evidence on behalf of the Ohio Bell Telephone Company and is herewith submitted and made part hereof.

Q. Explain the exhibit, please, and explain why in this case you used The Cumberland Telephone & Telegraph Company in making your study?

A. The studies of this nature are made by me entirely. [fol. 9514] They are very expensive to make and I have made quite a number of them, the intent being to test out all sections of the United States and rotate over this territory from year to year. The study for the year 1921 and seven months of 1922 was specially requested by The Cumberland Company for their territory so I simply made that my study for the year, and while the study is completely explained on the first page of the exhibit I can give an oral explanation of it possibly better from the second page of the exhibit.

Q. The material appearing on the first page of the exhibit is of your own composition?

A. Yes, sir, it is.

Q. Taking up page 2, will you make a brief explanation of it, including the method of determining the competing items and selecting the lowest competing prices and application of discounts, and also how you arrived at the non-comparable items and estimated prices; there are also some other matters that might be explained, including the necessity of considering switchboards in detail by equipment furnished, and also the items of purchasing, warehousing and freight. I will be obliged to you if you will just briefly discuss each one of those five factors.

A. The study covers the prices actually paid by The Cumberland Telephone & Telegraph Company in the states of Louisiana and Tennessee for 1921 and seven months of the year 1922, comparing it with the lowest prices of competing manufacturers, and the competing manufacturers [fol. 9515] were taken as the Kellogg and Stromberg Companies.

In making a study of this kind it is impossible to take a completed switchboard and compare it with a switchboard of another concern. They are always made to specifications and they are built for a particular location so that there is no quotation that you can get from any other concern that would match with it. In order, however, to get a measure of the comparison in those cases I have had recourse to breaking down the switchboard into its elements. The apparatus going into the switchboard will represent at least 50 per cent of the total cost of the switchboard. The apparatus considered individually can be compared to a very considerable extent with the same items manufactured by other concerns. In finding out what should be the items used as substantially competing items, I had recourse to the same procedure that I have already explained, namely, furnishing our engineering department with a list of the items to be compared and then asking for their statement of the items manufactured by other concerns and which were the substantially competing items. The engineers did not know the prices paid in any case and they were under particular instructions to show no favoritism to The Western Electric Company in making the comparison.

Coming now to Column A in the detail of this Page 2 of the Exhibit, we have, under telephone apparatus, a subheading "Items compared", and 46 per cent of the items were found to be comparable.

The Western Electric prices for those items were [fol. 9516] $512,965.00. The lowest price of the computing manufacturers was found to be $594,089.00, showing a saving of $81,124.00, or 15.81 per cent. There was 33 per cent of the items which could not be compared.

Now in that case I made the assumption that if these items had been purchased from these other concerns the prices would have been exactly the same as if purchased from the Western Electric, so that you will see the amount of this $369,980.00 also shown as the lowest price of a competing manufacturer.

The Western Electric items were furnished in that year, the year of the study, as f. o. b. the distributing house. There are two houses in that territory, one at Nashville and one in New Orleans. The items, however, manufactured by the competing concerns are f. o. b. factories. The result is that there is a differential in the freight applying against the independent companies and that has been figured as $5297.00.

Q. Which factory is — Rochester?

A. Stromberg-Carlson.

Q. What at Zion City?

A. The Cook Electrical Manufacturing Company. If these items had not been purchased through the Western Electric Company but had been purchased direct the Cumberland Company would have incurred purchasing and warehousing expense. That is taken here at four per cent of the price of these items.

Q. Why did you use four per cent?

A. Because I think it is a conservative figure to use. And [fol. 9517] that amount is applied against the price of the lowest competing manufacturer. Summing up, therefore, for apparatus we find that the Western Electric prices actually paid were $882,945.00, and that the lowest price of a competing manufacturer would have amounted, with freight and purchasing and warehousing, to $1,400,683.00, an increase of $121,738.00, or 13.79 per cent.

Exactly the same procedure was followed for lead covered cable and the differential in favor of The Western Electric Company was found to be 19.04 per cent. It might be mentioned in the case of lead covered cable it is sold f. o. b. Western Electric Works at Hawthorne, near Chicago, and the competing factory having a deep water sea-

board at Providence was able to secure a lower freight rate and the differential was against the Western Electric in the case of lead covered cable.

Q. In the case of the telephone apparatus, in which the differential was 13.79 per cent, in favor of what company was that?

A. That is in favor of The Western Electric Company. Combining the lead covered cable and the apparatus, giving the grand total, we find that on a total of $1,138,753.00, there was a saving to the Cumberland Company of $170,449.00, or 14.97 per cent.

Mr. Gentsch: Before we get any further on this, I think it is apparent from this witness' statement that he has no personal knowledge of the facts covered by his testimony. It is purely hearsay; and I think it is also apparent from his testimony that there are so many elements lacking as [fol. 9518] to make his testimony, if it was of his own personal knowledge, incompetent. I want to move that all of this testimony be stricken out.

Commissioner Maullar: Mr. Gentsch, do you happen to know about his qualifications?

Mr. Gentsch: I know his qualifications.

Mr. Burr: You were not here to hear them.

Mr. Gentsch: This testimony would not be admissible in any Court, even in a Justice's Court. It does not have the first qualification of testimony—expert testimony. And if it is competent at all it comes in under the heading of expert testimony and it does not, from his own statement, have the first qualifications of expert testimony.

Commissioner Poor: He said these exhibits, I believe at least the major portion of them, were prepared by him or under his personal direction.

Mr. Gentsch: That is it exactly. That is one of the reasons for my objection.

Mr. Burr: That is true.

Commissioner Maullar: The objection will be overruled.

Mr. Gentsch: Note an exception.

Q. Have you prepared a similar statement for The New York Telephone Company, Mr. Cox?

A. Yes, sir, I have.

Q. Have you any statement of this kind for the Ohio Bell?

A. No, sir, I have never made any for this Company.
[fol. 9519] Q. Are you now referring to the sheet marked Cox Exhibit No. 11?
A. Yes, sir.

Mr. Burr: I offer it in evidence.

And thereupon the Document above referred to was marked for purposes of identification as Cox Exhibit No. 11 and was offered and admitted in evidence on behalf of the Ohio Bell Telephone Company and is herewith submitted and made part hereof.

Q. Does the same kind of an explanation apply to Exhibit No. 11 as to Exhibit No. 10?
A. Yes, sir. The study was prepared under the same rules of procedure and altogether will stand on the same explanation. The volume of purchase is very nearly 14 million, and the differential in favor of The Western Electric Company is 14.32 per cent.

Mr. Gentsch: The same motion.
Commissioner Maullar: Same ruling.
Mr. Gentsch: Note an exception.

And thereupon the further hearing of this matter was adjourned to Tuesday Morning, May 20th, 1924, at 10:00 o'clock.

[fol. 9520] Tuesday Morning Session

May 20th, 1924.

And thereupon the further hearing of this matter was resumed pursuant to adjournment.

Present:

Same counsel as at previous session, and Henry M. Hagelbarger, on Behalf of the City of Akron, and J. E. Kinnison, on Behalf of the City of Canton.

And also EDWARD V. COX, resuming the stand for further examination in chief, continued his testimony as follows.

Examined by Mr. Burr:

Q. At the close of yesterday's hearing I had asked you with reference to Exhibit No. 11, which was a study for

The New York Telephone Company, showing the actual costs to that company for telephone apparatus and lead covered cable purchased from The Western Electric Company and what the cost would have been if similar purchases had been made from other suppliers. Have you made any other similar studies of the purchases of the Associated Companies and have you prepared the results in chart form?

[fol. 9521] A. Yes, sir, I have.

Q. Is the chart to which you refer the one marked for identification Cox Exhibit No. 12?

A. Yes, sir, it is.

Mr. Burr: It is offered in evidence.

And thereupon the document above referred to was marked for purposes of identification as Cox Exhibit No. 12 and was offered and admitted in evidence on behalf of The Ohio Bell Telephone Company and is herewith submitted and marked Cox Exhibit No. 12.

Q. And I will ask you to explain the exhibit briefly, if you please.

A. This exhibit shows all of the studies of this nature that I have made. That takes them back to the year 1919. Studies shown here prior to that date were not made by me but I have reviewed them and have found that they are substantially on the same basis and accurate.

Q. Are they taken from the records of the company under your jurisdiction?

A. Yes, sir, they are.

Q. You may proceed.

A. Each study is just shown here in summary. The year that the purchases were made is shown and the company and the actual prices paid under the standard supply contract, and then the lowest prices at which these same supplies could have been purchased from competing manufacturers and the per cent saving under the Western Electric Company.

I might call particular attention to the study for the year 1921, The Illinois Bell Telephone Company, because the [fol. 9522] percentage there is out of line, the percentage saving is out of line. What happened in that study was just this. In drawing off the items purchased the error was made of not recording the date, and as a result of that

we were either faced with doing the whole work over or else adopting this method, namely, to assume that the lowest price of the competitors during any time in that particular year was the price equivalent for the price of the Western Electric item. Now that is not just the lowest price for one of these companies. It is the lowest price for all of the companies considered. And to show how unfair that is to The Western Electric Company, I need only mention that, for instance, in one case, the price of an item used in this study was put into effect in the last of December. It was only in effect four days. But that is the price that is used here, and against it are shown the actual prices which were paid all during the year by the telephone company to the Western Electric Company.

To get some measure of what this injustice to The Western Electric Company was, I analyzed the purchases, which amounted to $10,000.00 and over, and it showed there that the percentage 7.89 shown in this study was 5.07 too low. In other words, the proper percentage is probably more nearly 12 per cent than the percentage shown here.

Mr. McConnaughey: Mr. Burr, may I ask him to tell how that part differs from what is done in the other instances?

Mr. Burr: Yes, I would be very glad to have it.

[fol. 9523] Mr. McConnaughey: How does what you did in that 1921 Illinois Bell Telephone study differ from what you did in the other instances?

The Witness: The scheme followed in the studies I have explained in detail already was to take the purchase as of a given date and compare it with the prices of these other companies as of the same date, so that they are on actually as closely a comparative basis as we could make them, time by time, date by date, throughout the year.

In the case of this Illinois Company we failed to record the date and I did not feel it would be fair to take the average throughout the year for those conditions. And it certainly would not be fair to take any particular price. So I took the lowest. I gave them the benefit of that and took the very lowest in effect in the year. And there were many price changes in that year. In fact, in these studies from end to end I have done everything to be fair. If there was any doubt about an item I have said it was not an item that was comparable and therefore I have assumed the prices on either side would have been the same.

Q. What significance is there in the results of these studies with respect to the purchase of apparatus and lead covered cable by The Ohio Bell Telephone Company?

A. I cannot say without investigating the purchases of this company exactly what the savings would have been because the amounts of savings would depend on the dates of purchase, the amounts purchased, and so on, but it would have been of this same general nature. The percentage [fol. 9524] savings would have been substantial, and I have never made a study where they were not as this record shows here. The contracts are identical under which they make these purchases.

Q. Have you any studies of the purchases of an independent company?

A. Yes, sir.

Q. Showing what it actually paid for telephone apparatus and lead covered cable in comparison with what it would have had to pay for similar purchases from The Western Electric Company if purchased under the standard supply contract, as does The Ohio Bell Telephone Company?

A. Yes, sir, I have.

Q. How have you been able to make such a study?

A. A number of independent companies have been taken over by Bell Companies and the requirements of the Interstate Commerce Commission are that the essential data that went with these other companies shall go along with them. And the purchasing records of those come into the possession of the Bell interests and I have actually gone to those purchasing records, sent my representatives and have made studies from them.

Q. Is one of the studies to which you refer shown in the compilation consisting of five sheets marked for identification Cox Exhibit No. 13?

A. That is one of these studies, yes, sir.

Q. That is the one applying to the Citizens Telephone Company of Grand Rapids, Michigan, is it not?

A. Yes, sir.

[fol. 9525] Q. Who made that study?

A. This was made by me and under my direction. I sent a man to Grand Rapids, one of my own men, and he examined the purchasing records there, drew off the data and sent it to New York, where the rest of the study was completed under my immediate supervision.

Mr. Burr: We offer Cox Exhibit No. 13 in evidence.

And thereupon the document above referred to was marked for purposes of identification as Cox Exhibit No. 13 and was offered and admitted in evidence on behalf of The Ohio Bell Telephone Company and is herewith submitted and made part hereof.

Q. I will ask you to explain it briefly?

A. This list is analagous to that which I have explained in detail for The Chesapeake & Potomac Company—I mean The Cumberland Telephone & Telegraph Company, Exhibit 10, excepting that the situation is turned around; that is to say, the actual purchases were made by the independent company and the items purchased were compared with the manufactures of The Western Electric Company to see what could have been furnished by The Western Electric Company. If an item was actually purchased by The Citizens Company and The Western Electric Company did not have a substantially competing item, it is classed here as a non-comparable item and the Western Electric price is [fol. 9526] taken as the same as that actually paid by The Citizens Company.

On Page 2 of the Exhibit—Sheet 3 of the Exhibit, I should say—the summary is given. It would seem of telephone apparatus purchased the items compared amounted to 18 per cent of the purchases. It actually cost $41,755.00. The Western Electric ½rice under the standard supply contract would have been $37,319.00, showing $4436.00 higher than The Western Electric Company for the amount actually bought; and that was an increase of 11.89 per cent over the Western Electric price. The items not compared are shown and the freight is treated exactly the same as it was in the other exhibit. Similarly with the purchasing and warehousing. And lead covered cable also follows in the same way.

In summary, this study covered total purchases and freight and warehousing amounting to $236,950.00, and under the supply contract that would have been furnished by The Western Electric Company at a saving of $25,882.00, or 12.26 per cent.

Q. The figures under the column marked "per cent of total purcases" include the entire purchases, that is to say, 100 per cent, do they not?

A. It is not 100 per cent of the purchases of the company. It is 100 per cent of the items that were of the classifica-

tion analyzed here. In other words, they were outside plant items, stationery and all that kind of things that were not considered in the study.

Q. Yes. Is the data shown on page 1 of the Exhibit your own compilation?

A. Yes, sir, it is.

[fol. 9527] Mr. Burr: That sheet I think speaks for itself and inasmuch as the Commission and all of us are anxious to make time this morning I won't ask the witness to go through a repitition of those statements, if you will accept them as his statements.

Commissioner Poor: I want to ask Mr. Cox one question. As I understand it these purchases were made by the independent company from somebody other than The Western Electric Company. It does not show a difference in the price to the independent by The Western Electric Company?

The Witness: No, sir, you are correct. These purchases were made very largely from the Stromberg and Kellogg Companies. There were a few cases where they purchased Western Electric items. I think there is some Western Electric cable here. If they did, they purchased it on the general trade basis and would have been in competition with the other manufacturers, and it is taken as it stands as their actual purchases and it is priced against the price of the Associated Companies. There are very few, however, of those items in here.

Mr. Laylin: It seems to me that we ought to make the formal objection to this. I do not care to argue it, but it seems to me we ought to save our exceptions to this class of testimony inasmuch as it relates to circumstances and raises collateral issues here which cannot be tried in this case. We do not know as to these prices. We do not know anything of the surrounding circumstances involved in these purchases. [fol. 9528] And we simply want to note a formal exception.

Commissioner Poor: Do you object to this line of testimony?

Mr. Laylin: I do.

Commissioner Poor: It is overruled and exceptions may be noted.

Mr. Laylin: Note an exception.

Q. Have you made a similar study for the Kimloch Long Distance Telephone Company of St. Louis?

A. Yes, sir, I did.

Q. Is it shown in the exhibit consisting of five sheets and marked for identification Cox Exhibit No. 14?

A. Yes, sir.

Mr. Burr: It is offered in evidence.

Mr. Hagelbarger: I object to this testimony, if Your Honor please. I do not see how these cities can undertake to review testimony that has been gathered in this way. What have we got to do with Missouri? I cannot see for the life of me how the Commission can give any credit to such testimony, how it can bear upon this question, and I strenuously object to it. I wasn't here yesterday. I wasn't able to be here*m* but it occurs to me that we are taking a good deal of time upon something that apparently is put in in such shape that we cannot refute it. It would be futile for the Cities to undertake to chase around to Grand Rapids, Michigan, and St. Louis, Missouri, and to these other far-flung cities and localities and endeavor to find out what they [fol. 9529] paid for material, and if the Bell Company thinks it is driven to such extreme measures as this, why, God pity them.

Mr. Burr: Are we to understand that the Cities are driven to the same extreme measures because they have gone as far afield as Grand Rapids in order to find an expert for their purposes in this case?

Mr. Hagelbarger: Grand Rapids is not as far away as New York.

Mr. Kinnison: Wouldn't the competent way to prove this be to take the schedule of prices paid by The Ohio Bell and check it against the local market conditions?

Mr. Burr: We are coming to that next.

Mr. Kinnison: Wouldn't that be the only way to prove it?

Commissioner Poor: Of course that comes nearer to what we have under consideration here. If this is linked up in some way so as to make it admissible, it is proper. It will be admitted at the present time. If it is not linked up in some such manner it will be ruled out.

Mr. Gentsch: I would like to enter a formal objection to any and all of this testimony on another ground, that is this is not proper testimony which should be considered in a case of this kind at all. If there is any testimony which is admissible at all along this line and from this witness it seems to me that that must be confined to the question, not of comparable prices but of cost. It is in the testimony that

the A. T. & T. Company owns The Western Electric Com-
[fol. 9530] pany, and in line with the 107 Ohio State, a corporate fiction cannot be interposed to let them make a hidden profit out of their dealings with the Ohio Bell, and the only evidence which is competent here is evidence of cost,—not cost to the Ohio Bell but cost of production to The Western Electric Company. If, through the fiction of separate corporate identities, intervening corporations can come in, as The Western Electric Company is coming in here, and through that fiction profits can be derived indirectly by The A. T. & T. Company, it does not take very much of an imagination to come to a point where under no circumstances can any given rate, according to that kind of situation, be sufficient to make a fair and reasonable earning upon the real investment. As I see this proposition, The American Telephone & Telegraph Company, as the owner of the Ohio Bell and subject to the Public Utility Law, must be treated as identical with the Ohio Bell. And any items of expenditure which may be reckless in their waste or extravagant or showing a preference over and above what is fair and reasonable ought to be disregarded by this Commission in getting at costs; because the question which is here before this Commission is whether the rates in question are fair and reasonable rates.

Are the rates in question necessary in order to give a fair and adequate return on the investment in Ohio? If, through these fictions of separate corporate entities, profits may be surreptitiously obtained by The A. T. & T. Company, it just simply nullifies the object and intent of the [fol. 9531] whole utility law, and it seems to me that this whole line of testimony, even if it were based on facts which are here before us and which we could sit down and analyze, if we could get at the fundamental figures, could not be competent; but based as they are upon unknown quantities, unknown bases, we do not know what has been considered and what has been omitted. We all know how figures can be juggled and by an elimination of certain items from the study the face of the whole thing can be changed.

But the fundamental objection here is that The American Telephone & Telegraph Company is the owner of the Ohio Bell and any expenditures which the Ohio Bell makes, especially payments which are resulting indirectly in profits to the A. T. & T. Company, must be disregarded or the

whole structure of your utility law is going to fall. The whole object of it is evaded and subverted.

That this record may be kept straight I want to make the formal motion to strike out all of the testimony of this witness based upon these so-called studies as being incompetent, irrelevant and immaterial.

Mr. Burr: The entire argument of the gentleman on the other side proceeds upon the fallacious theory, Your Honor, that because The American Telephone & Telegraph Company has invested some of its money in The Ohio Bell Telephone Company and some of its money in The Western Electric Company ipso facto it is not entitled to a return on that investment.

Mr. Gentsch: No, no.

[fol. 9532] Mr. Burr: Now that is an absolutely fallacious theory.

Mr. Gentsch: No, no, we are not saying that at all, Mr. Burr.

Mr. Burr: Just a moment, please. We have heard a great deal about hidden profits and indirection and all that sort of thing in the public press lately. And the argument of the gentlemen on the other side smacks very strongly of some of the arguments which we have been reading. They are, however, none the less fallacious. And what we are showing by the evidence here today and what we showed yesterday was this, first, that the prices of The Western Electric Company to the Associated Bell Companies are in every case less than the prices for the same apparatus sold by The Western Electric Company to the trade generally. Certainly that is some justification for the arrangement whereby the Associated Companies purchased a large part of their supplies from The Western Electric Company.

The corollary of the proposition is equally true, that the independent telephone companies considered the Western Electric apparatus and supplies valuable enough to pay for those supplies and that apparatus more than the Associated Bell Telephone Company has paid for the same thing. That certainly is proof in itself of the benefit of the supply contract to the Associated Companies including the Ohio Bell Telephone Company.

As to this particular testimony under consideration now [fol. 9533] we are showing by it how much more it cost the independent companies to purchase supplies and ap-

paratus of the kinds shown in the exhibits in the open market than it would have cost them if they had had the benefit of the supply contract as the Associated Companies have. And there again the advantage of the contract, not only from the standpoint of its benefit to the Associated Companies but also the benefit which would have accrued through it to an independent company had it had the privileges under the contract, is clearly shown.

I do not care to take up a great deal of time arguing the question here. Your Honor did not hear some of the testimony adduced yesterday afternoon and I am sorry over that, but I think that the record will bear me out in what has been stated.

I may say also that the testimony of the prices, and all that which we are now offering, has been offered, admitted, received and commented on with approval by many Commissions in this country, and I know of no case in which any of it has been ruled out. That certainly is precedent for the manner in which we are conducting our case in this issue.

Mr. Gentsch: Just before we close the matter, I cannot let this go without just one further word. Let us look at the situation as it is here and as shown by the evidence before this Commission. The evidence before this Commission has shown, if it has shown anything, that is, the evidence brought out by the Bell Company, that the American Telephone & Telegraph Company has a virtual monopoly [fol. 9534] of the telephone business in the United States, and within the last four years they have been taking over one independent company after another until today but very few independent companies are in existence, and in another three or four years I do not suppose there is going to be one.

The very fact that Mr. Burr can stand up here and make the statement that he did a minute ago with reference to these contracts and this evidence shows the frame of mind and the security which the Bell people feel in their situation, that they have got this telephone situation in the palm of their hand and that all of us can just lump it if we don't like it. You have got a monopoly here and it is shown by their own evidence just as clear as a bell. You have an absolute, or a practically absolute monopoly of the telephone business in the United States owned by The A. T. & T. Company. And you have got these so-called subsid-

iary companies, which are owned by the Bell Company, compelled to purchase a great amount of their apparatus and supplies from The Western Electric Company, which is in turn owned by the Bell Company.

Mr. Burr: That is not so, if you will excuse me.

Mr. Gentsch: They have got a restricted market in which to buy. They have got not a word to say with reference to the prices they are compelled to pay. It is true that there have been precedents for this kind of testimony. They have built this thing up step by step, and because the matter has not been gone into thoroughly in a lot of these [fol. 9535] cases that they are now citing, in many cases the testimony has been, as the Court has said, very meager upon the question of the relationship between the A. T. & T. Company and these other companies, and they were compelled because of the meagerness of that testimony, to sustain the 4½ per cent contract. It has been because of the lack of testimony that that thing has gotten into the shape that it has and the precedents have been up to this time what they have. Where are your independent telephone companies in the State of Ohio today? They are practically wiped out, and what are not now wiped out will be in a year or two.

Mr. Burr: There are between four and five hundred.

Mr. Gentsch: You have got them in the hollow of your hand and you are going to take them whenever you want them. You know it and I know it.

Mr. Burr: Oh, that statement is not true and is not fair.

Mr. Gentsch: You have an entirely different situation on the manufacturing end in the last four or five years. When the Kellogg Company and the Stromberg Company and these other independent companies had a wide range of independent companies who could purchase their products they were in some shape to compete with the Western Electric Company. But what shape are they in today? They have got to eat out of the hand of the A. T. & T. Company and they have got to fix their prices as the A. T. & T. Company tells them to fix them, and unless they will fix their prices [fol. 9536] as the A. T. & T. Company tells them to fix them they have got to go out of business. What is there to prevent, when this monopoly becomes absolute, as it is going to become in a very short time—what is there to prevent a continual rise in prices here by The Western Electric Company until those increased prices are going to absorb

all of the earnings of the Ohio Bell and these other alleged subsidiaries throughout the United States and still leave nothing to be paid in the way of returns on the actual investment? It is coming to that just as sure as we are here.

It used to be that I could telephone from Cleveland to New Philadelphia for 35 cents. You can't do it for less than 80 now. Our telephones in the City of Cleveland used to cost us $72.00 a year, and my own office is costing now about $50.00 a month.

Commissioner Poor: I think you are getting a little far away from the argument on this.

Mr. Gentsch: I know, but——

Commissioner Poor: Let us don't get too far. We are on the question of the introduction of these comparative studies.

Mr. Gentsch: What I am trying to bring home to you is this, that there isn't anything in the world that is going to prevent the absorption of all of the revenues, no matter what the rate is, if this fiction is to be permitted to continue.

Commissioner Poor: I do not want to interrupt you but I think you are getting too far away from the point, which [fol. 9537] is on the question of the admission of this evidence.

Mr. Gentsch: Now just let me put this to you. The text books have laid down certain fundamental principles as to what constitutes a contract. There must be parties in the first place, not one party but two or more; they must be at arms length and there must be mutual considerations for the entering into of the contract.

Commissioner Poor: Now, Mr. Gentsch, I am going to interrupt you. We are not at the point of deciding right now with regard to the contract. What we are considering here is the reasonableness of the amount paid by the Ohio Bell to the A. T. & T. under this 4½ per cent contract. Now this testimony that is offered here, to my mind, has some bearing on whether that amount paid under that contract is reasonable or unreasonable. But to what extent the Commission may give weight to it as showing that, is another question. I think the line of testimony is competent——

Mr. Gentsch: Don't you see here——

Commissioner Poor: And your objection will be overruled.

Mr. Hagelbarger: Note an exception.

Mr. Gentsch: Note an exception.

Mr. McConnaughey: Note an exception for the City of Dayton and for all of the Cities.

Q. Mr. Cox, in order not to take any more time than is necessary, and referring to your statement that you have carefully been over all of these exhibits and you know their contents, will you tell the Commission whether or not the [fol. 9538] statements contained and the amounts shown in all of the exhibits so far offered are true and correct to the best of your knowledge and belief?

A. Yes, sir.

Mr. Dotson: We object to that.

Mr. Burr: If you want me to go——

Mr. Kinnison: His opinion can neither weaken nor strengthen the exhibit.

Mr. Burr: He has a right to say whether a statement is true, a statement contained in an exhibit is true and correct to the best of his knowledge and belief.

Mr. Kinnison: It is assumed when you put a witness on the stand you vouch for his integrity. If the man testifies that he collected those, his opinion as to the veracity of it would not enter into it.

Mr. Burr: You make it necessary for me to go back over all of the exhibits and interrogate him as to every figure and amount contained in them.

Mr. Laylin: Why interrogate him on that fact at all? He has testified to it.

Mr. Burr: He has testified that he has prepared these exhibits.

Mr. Shuler: He and his assistants.

Mr. Kinnison: He said the assistants in his own office.

Mr. Burr: The question is competent and has been asked over and over again.

Mr. Hagelbarger: He said he sent somebody to Grand Rapids and that somebody collected something up there [fol. 9539] and brought it back to him. How does he know whether it is correct or not? He is asking him if in his opinion it is correct. That is opinion evidence about a subject about which no Court would ever permit a witness to testify as to his opinion.

Mr. Kinnison: It is not subject to expert opinion.

Commissioner Poor: His opinion on the proposition

would not make it correct if it is not correct. There is no question about that. But if they were prepared by him or under his supervision he can testify as to the fact as to whether he believes they are correct and represent the figures under consideration——

Mr. Dotson: Your Honor, I think this question can be clarified by taking this view of it, that he is really being asked the question now that will require him to make just such answer as the Commission itself must make on this testimony that is brought in. It is for the Commission to determine the integrity of this testimony, how substantial it is, how reliable it is. Now his opinion cannot and should not in any manner effect the opinion and the consideration and the judgment of the Commission. Therefore no Court would allow it and we assume that we are entitled to the privilege of having the same tests given to the testimony at least at this juncture in this respect that would be given to it in Court. Now it is for the Commission to pass upon the strength, validity and worthiness of this testimony, not for this witness.

[fol. 9540] Commissioner Poor: There is no question about that, Mr. Dotson. But the way I interpret it, the effect of the question on my mind is whether the figures contained in the exhibit were correct figures.

Mr. Burr: To the best of his knowledge and belief. He is not asked for his opinion at all. It simply means this, that I will have to go back over the exhibit and take up the whole matter. I will have to take this item of $43,975,000.00 and ask him if that was the amount of sales of The Western Electric Company to the Associated Companies of Western Electric merchandise for the year 1918. His answer would be that it is.

Mr. Kinnison: His answer would be that it so shows from the records as gathered by his assistants.

Mr. Dotson: The objection then is as to form.

Mr. Burr: Alright, it will take all morning if they split that hair.

Mr. Dotson: The reason I object is that the form of the question gives too much latitude for this witness. This witness is in position to testify without being led.

Mr. Burr: Alright.

Mr. Dotson: We want the testimony to come from this witness, not from the attorney.

Mr. Burr: Alright, there are several thousand figures shown in these exhibits.

Mr. Dotson: There is a way of getting at it. You know how to get at it. I don't need to tell you.

[fol. 9541] Commissioner Poor: The way I interpret his question, he has said that they used a figure in here of 50 or 60 thousand dollars that was paid by a company for a certain period. The question is whether that represents a true figure. And as an offset against that they have said that if they had bought from somebody else it would have cost them $70,000.00. To that extent it is alright, I think. The question is asked him whether it represents true figures, whether they are correct figures, and not assumed figures, or something of that kind.

Mr. Dotson: We think the testimony ought to come in in some such shape as this; ask him what that figure represents. He can say that that figure represents the total sales of the Western Electric. Then ask him how did he obtain those figures, what is the source of those figures. He can tell what the source is from which he gets that data. This is as far as he can go. Not it is up to the Commission to determine how worth- is that testimony. He cannot say a word as to whether he thinks it is good or bad. That is not in his province. It is for him to give the Commission the source of these figures. If it comes in in that way, why I can readily see that they have furnished us with evidence that has some character.

Mr. Kinnison: Mr. Burr is asking his opinion as to the existence of facts.

Mr. Burr: I did not say anything about facts.

Mr. Kinnison: Opinion testimony cannot be given as to the existence of facts. He may draw his opinion as a [fol. 9542] conclusion from facts.

Mr. Dotson: I think that would be a very short examination, practically as short as the one that Mr. Burr has suggested—what those figures represent, what the source of his opinion is. He can tell that quickly and we are through with it. He knows. If he don't then he hasn't the knowledge of this stuff that he is producing here that I assume he has.

Commissioner Poor: Let us start all over again.

Q. Mr. Cox, so far there have been offered and admitted in evidence Cox Exhibits 1 to 14 inclusive, and those ex-

hibits contain many thousands of figures, quantities and amounts. Whose figures are those?

A. Some of those are completely mine.

Q. Yes.

A. They have been compiled from various sources. I have been back to the roots of the compilation. In the case of the sales figures for The Western Electric Company I cannot go back and examine their sales slips for millions of items. But I have myself taken the figures from their company reports for their own benefit to which I have access and which I have checked to the point of knowing that they represent proper accounting principles and to the further point that they are accurate and I have taken myself these figures of sales from those reports.

Now, on other matters I have had my assistants collect data for me. I have checked those from my knowledge of the general situation. I have checked computations to the point of knowing that they are reasonable, that they are [fol. 9543] accurate, and altogether I have gone as far to make these exhibits correct as a man possibly can in a busy business life.

Mr. Dotson: I object to that and move that it be stricken out. It is a matter of opinion as to whether he has gone as far as he could or not.

Commissioner Poor: It may go out.

The Witness: One of these companies here in the exhibits —we haven't come to that company yet.

Q. Have all of these figures been compiled either from records of The Western Electric Company or the Associated Companies or independent companies to which you have had access?

A. Yes, sir.

Mr. Gentsch: We object to that. He is asking him to say where they came from and he has already testified that he did not have personal knowledge about where a lot of them did come from. He says his assistants gathered together a lot of them. How do we know whether they made a correct abstract?

Commissioner Poor: If he knows where he told his assistants to go and examine them——

Mr. Gentsch: That is not the question.

Commissioner Poor: Why, I think it would be proper.

Q. Have you any knowledge as to the incorrectness of any of these figures?

Mr. Kinnison: I object.

Mr. Burr: I am asking for his knowledge.

[fol. 9544] Commissioner Poor: The objection will be overruled.

Mr. Dotson: That is not the right way, Mr. Burr.

Mr. Kinnison: Note an exception.

Q. Have you any reason to believe that any of these figures in any of your exhibits are incorrect?

Mr. Kinnison: I object. That is in violation of all of the rules of evidence. If a man has testified as to facts he cannot substantiate his testimony by giving his opinion as to the existence of facts.

Commissioner Poor: As I understand it he does not testify at this time that this is a fact. He is testifying to whether these figures are correctly taken from the sources from which they are taken.

Mr. Kinnison: He cannot do that because he has told how they are collected, through his assistants. That is the fact in itself. His opinion cannot strengthen it.

Commissioner Poor: There are certain things in the matter of compilation of figures and bookkeeping in large companies that no one individual could have personal knowledge of. In matters of this kind if we held it down to the man who actually took off the figures we would never get through any case.

Mr. Kinnison: I recognize that, Your Honor, but my belief is that his exhibits stand as correct until impeached by us. As far as that is concerned, they do not need to be supported by his opinion.

[fol. 9545] Commissioner Poor: I think you are correct about that.

Mr. Dotson: We will adhere to what we started out to do. If we confine ourselves to his testimony as to the manner or method or means by which he procured this information, and drop it at that, that is sufficient, because it is for the Commission then to determine how reliable that source of information is, and we are playing safe or playing within the limits of sound rules of evidence.

Mr. Burr: Just to get Mr. Dotson to stop, I will withdraw the question.

Mr. Dotson: Alright, that is an effective way to stop me after I have made the comment.

Q. Tell the Commission whether or not you arrived at the results shown in Exhibit 14 in the same manner and by the same method as those shown in Exhibit 13?

Mr. Hagelbarger: I object as leading.
Mr. McConnaughey: How did he arrive at it?

Q. As compared to the method used in arriving at the results shown in No. 13, what method did you use in arriving at the results shown in Exhibit No. 14?

Mr. Hagelbarger: I object.
Mr. Dotson: Why don't you ask him, how did you get your information set up in Exhibit No. 14?
Mr. Burr: I could do that, Mr. Dotson, but I am trying to shorten this inquiry because we have been asked to do it.
Commissioner Poor: The objection to the last question [fol. 9546] will be overruled.
Mr. Hagelbarger: Note an exception.
Mr. Burr: The Commission says you may answer.

(Question read.)

The Witness: We have followed the same program entirely.

Q. Calling your attention to the compilation marked Cox Exhibit No. 15, tell the Commission whether or not you made a similar study of the cost of telephone supplies to the Ohio State Telephone Company for the years 1919 and 1920?

Mr. Hagelbarger: We object and except.

A. We did.

Commissioner Poor: You may have it understood, Gentlemen, that your objection goes to all this same class of testimony.
Mr. Laylin: Yes, in order to save time.

Q. Is the study shown in Cox Exhibit 15, Sheets 1 to 5 inclusive?
A. Yes, sir.

And thereupon the Paper Writing above referred to was marked for purposes of identification Cox Exhibit No. 15.

Q. Explain the exhibit briefly?

A. This study was made of The Ohio State Telephone Company and covers the purchase made by it for the years 1919 to 1920 inclusive and this is of course the period prior [fol. 9547] to the taking over of its plant by the Ohio Bell Company.

The first page of this exhibit describes the study in detail and was prepared by me; but in summary, I will simply say that the total actual purchases, including allowances for freight on the purchases, amounted to $570,220.90; that these same supplies could have been purchased—these same supplies or their substantial equivalent could have been purchased by The Ohio Bell Telephone Company from the Western Electric Company under the standard supply contract for $496,770.23, showing that the prices actually paid were $73,450.67 higher than the Western Electric prices, which is 14.79 per cent higher.

Mr. Shuler: May I ask one question there, please?

Mr. Burr: Yes, Mr. Shuler.

Mr. Shuler: Mr. Cox, in this do I understand you figured freight and warehousing to the Ohio State?

The Witness: The freight wherever shown on their invoices is actual freight. If the freight is not shown it has to be estimated.

Mr. Shuler: If some of those supplies were delivered F. O. B. Columbus and you figured freight on those supplies, your estimate would be wrong to that extent?

The Witness: If that were so. But the invoices show whether they are F. O. B. or not.

Mr. Shuler: Will they?

The Witness: Yes, sir, they do.

[fol. 9548] Mr. Burr: We offer Cox Exhibit No. 15 in evidence.

And thereupon the Document above referred to was marked for purposes of Identification as Cox Exhibit No. 15 and was offered and admitted in evidence on behalf of The Ohio Bell Telephone Company and is herewith submitted and made part hereof.

Q. What is the source of the information shown in the study, Mr. Cox?

A. These are the actual invoices rendered by the suppliers against The Ohio State Telephone Company.

Q. Where did you have access to them?

A. The data is on file in the custody of The Ohio Bell Telephone Company and in this case the data was drawn off those records under my request by the General Auditor of The Ohio Bell Telephone Company. I furnished him the rules and the forms for preparing it and he filled them in for me.

Q. From what source have you secured the Western Electric prices used for comparison in this and in your other exhibits?

A. Those prices are taken directly from their price lists and where prices have had to be figured for other companies they have been taken directly from their prices of the same ruling date, whatever was involved in any particular comparison.

Q. How have you secured the prices of other manufacturers used in your exhibits from time to time?

A. By reference to their price lists and discount sheets, [fol. 9549] and in every case the maximum discount has been allowed.

Mr. Dotson: Have you made a personal check upon which you base the statement just made that the maximum discount rate has always been allowed?

The Witness: Yes, in this way. My authority for that statement is this. I receive direct from these principal companies that are involved in these studies, the Kellogg and Stromberg companies, their actual sheets, price lists and discount sheets. I have the full information so far as I can see that goes to one of their own agents in selling these goods. Now in order to ascertain whether those are the prices that are really used and that there was not some further scale of discount that I did not have access to I have checked these prices of these sales to independent companies, such studies as we have here, back against the price lists which I have covering those particular dates and I found they have priced them in accordance with those price lists or at higher prices. In other words, I have taken in my studies maximum discounts, and the actual prices charged a company such as the Ohio Bell Company have been no lower and often substantially higher.

Q. You mean the Ohio State Company?

A. Ohio State, yes.

Mr. McConnaughey: Never lower?

The Witness: There was one case where there was a special discount allowed. That was so special that I have not given it consideration here—an extra two per cent [fol. 9550] discount.

Q. Have you made studies of other independent companies and prepared it in chart form?

A. Yes, sir.

Q. Is the chart the one marked No. 16?

A. Yes, sir.

And thereupon the Document above referred to was marked for purposes of identification as Cox Exhibit No. 16.

Q. What is the source of the amounts and the data shown in that chart?

A. The data for Exhibit 16 was taken from studies all of which were prepared by me and under my immediate direction and supervision. It simply summarizes the studies of independent companies, three of which have been presented in the preceding exhibits and the others that were made at an earlier date. I might add at this point that the detail for the study for the Utica Home Telephone Company, covering the years 1905 to 1912 I prepared myself. In that case the invoices that were rendered by the suppliers against The Utica Home Telephone Company were filed, together with the paid check of The Utica Home Telephone Company. The whole information was all there together and it was a beautiful set of records, and I can testify that the showing that is made here for The Utica Home Telephone Company is correct from these original documents.

[fol. 9551] Mr. Burr: We offer Cox Exhibit No. 16 in evidence.

Mr. Gentsch: We object on the same ground heretofore stated.

Commissioner Poor: It is understood that you have your objection, overruled and exceptions, for the whole line of testimony, if the objection is on the same ground.

And thereupon the Document above referred to was marked for purposes of identification as Cox Exhibit No. 16 and was offered and admitted in evidence on behalf

of The Ohio Bell Telephone Company, subject to the above objection and exception, and is herewith submitted and made part hereof.

Q. Mr. Cox, thus far you have confined your testimony to the question of prices. Have you made a study of any other phases of the standard supply contract?

A. Yes, sir, I am very much interested in the matters of service and the matters of the amounts of supplies that the Company must carry in order to properly maintain its service intact.

Q. Have you made a study of that question?

A. Yes, sir, I have.

Q. What effect does the Western Electric contract have on the amount of supplies carried by the Associated Companies, including The Ohio Bell Telephone Company?

A. It reduces the amount that they would have to carry.

Q. How and why?

A. Because the central warehouses in which they stored [fol. 9552] their supplies prior to executing these contracts have been taken over by The Western Electric Company, and furthermore the possibilities of quick service by The Western Electric Company with numerous distributing houses is such that quicker service can be given with a still smaller amount of supplies carried by the individual exchanges of the telephone companies.

Q. How much of the stock of all of the warehouses of The Western Electric Company is available to any one company, to any one of the Associated Companies, in case of emergencies?

A. All of the warehouse stock is always available to any company that needs it.

Q. What does it amount to in dollars?

A. It has not been less than $16,000,000.00 for a number of years. It has been as high as $20,000,000.00 a number of times.

Q. What arrangements has The Western Electric Company with other manufacturers with reference to the service it secures for the Associated Companies from the outside manufacturers.

Mr. Gentsch: What manufacturers do you refer to?

Mr. Burr: Manufacturers of telephone apparatus or of articles which the Western Electric buys for the Associated Companies.

Mr. Gentsch: I was just trying to get at that particular branch of that you had in mind.

Mr. Burr: It goes to all of that, crossarms, and pins and stationery and all the other things that the Western Elec- [fol. 9553] tric Company buys for the Asociated Companies, things which are not of its own manufacture.

The Witness: The general arrangement is that the manufacturer guarantees to keep on hand——

Mr. Kinnison: Just a minute. Is there a contract on that with the other manufacturers?

The Witness: The Western Electric Company has contracts with each of its suppliers.

Mr. Kinnison: You speak of "the general arrangement." Do you refer to a specific contract?

The Witness: No, I am referring to the type of contracts. These contracts follow a definite line and one of the provisions of the contract is that they shall keep stocks on hand.

Q. Who shall keep stocks on hand?

A. In addition to those which The Western Electric Company has itself.

Mr. Gentsch: I want to ask that this be stricken out on the ground that it is not the best evidence. If there are these contracts in effect they are the best evidence.

Mr. Burr: We do not insist on the question.

Commissioner Poor: Proceed.

Q. Do you know the amount of supplies carried by independent telephone companies?

A. I know it as of certain dates.

Q. As of what date?

A. Each telephone company in interstate business has to make a report to the Interstate Commerce Commission, under oath, as of the 31st of December of each year. I have [fol. 9554] access to those reports and have drawn off information from them.

Q. Have you prepared an exhibit on the subject?

A. Yes, sir, I have.

Mr. Burr: It may be marked Cox Exhibit No. 17 and is offered in evidence.

Mr. Gentsch: We note the same objection.

Commissioner Poor: It is overruled.

Mr. Gentsch: Note an exception.

And thereupon the Document above referred to was marked for purposes of identification as Cox Exhibit No. 17 and was offered and admitted in evidence on behalf of The Ohio Bell Telephone Company, subject to the above objection and exception, and is herewith submitted and made part hereof.

Q. Will you look at Cox Exhibit No. 17 and explain the method which you have followed in drafting it?

A. This exhibit lists the independent companies. I have taken all of the independent companies which have no contract with the Western Electric. And they are the Class A companies under the classification of The Interstate Commerce Commission. I believe that that requires their annual revenues shall be $250,000.00 a year or greater. The figures shown for each company are taken from those reports, that is to say, the total number of stations is reported and the total amount of material carried in the supply ac- [fol. 9555] count reported and I have divided one by the other and gotten the supplies per station.

Q. That is how much?

A. The average of this entire list is $3.69 per station. I might call attention to an item there that is interesting. The Johnstown Telephone Company only has 14 cents shown in its annual report as a per station figure for supplies. It was an interesting figure and I wrote the President of the Company to get some more information on it. His reply was to the effect that they charged their material directly to the final accounts on purchase, and this represented a few odds and ends as to which they had no idea what they were going to do with them, and it was not representative of the amount. However, inasmuch as it came in the list I have thrown it in there on the figure shown in the Interstate Commerce Commission report.

Q. Do you know the amount of the supplies of The Ohio Bell Telephone Company?

A. That, corresponding to this same year and date, was $2.08.

Q. What bearing has the amount of supplies carried by The Western Electric Company on the amount of $2.08 for supplies carried by The Ohio Bell Telephone Company?

A. If The Western Electric Company did not have this contract with The Ohio Bell Telephone Company they undoubtedly would carry more supplies than they do. I

assume that they probably will have to carry, instead of $2.08—they will probably have to carry $1.50 additional.
[fol. 9556] Q. Per station?

A. Yes, per station. Say in the neighborhood of $3.50.

Mr. Gentsch: We ask that that answer be stricken out.

Commissioner Poor: It is a matter of speculation and it may go out.

Mr. Burr: Well, this witness, Your Honor, qualified yesterday as an expert on the question of supplies for all of the Associated Companies.

Commissioner Poor: Well, there are so many things that go into the consideration of what they would carry, Mr. Burr, that I think the matter is very indefinite. Go down this list and you will find the different companies carrying different amounts.

Mr. Burr: Well, save our exception.

Q. What services, if any, does The Western Electric Company render to the Associated Companies in times of emergencies?

A. Well, they are very conspicuous in their services then because their organization permits them to function in that way and every effort is made to meet their obligations. There are outstanding occurrences of that kind that are continually happening.

Q. Give some illustrations.

A. Go back to the Baltimore fire, the San Francisco fire and the very serious floods in this section here at Columbus in 1913 and continuously recurring damage from storm in the way of sleet, tornado and so on.

Q. Explain some of the services rendered by the Western [fol. 9557] Electric in connection with those causalties?

A. Well, to take a recent occurrence, I would mention the fire that destroyed the building and telephone exchange at Medill, Oklahoma. That is 900 miles west of Chicago. This fire took place on December 18th last. There was a day lost in determining the new location.

Q. Of what?

A. Of the exchange. The way the new location was determined, the requirements for the exchange were telephoned to Hawthorne.

Q. What is Hawthorne?

A. That is the manufacturing headquarters of The Western Electric Company. Now instead of going to the

point of patching up service, it was possible, owing to this Western Electric Contract, to go ahead right to the permanent installation and save a lot of preliminary expense.

Mr. Kinnison: I object to this. This does not prove the contract of the Ohio Bell, what happened in Oklahoma or some place else.

Q. I will ask you whether or not the Western Electric——

Commissioner Poor: I do not see that it has so very material a value in this case except to show that they claim that the readiness to do this has a value.

Mr. Kinnison: It would be rather inchoate I think.

Mr. Burr: It is a very substantial value, and while we all hope that these storms and fires will not occur in the State of Ohio, we nevertheless know that in a given period they [fol. 9558] are bound to happen; they do and have happened here. Our experience has shown that they do happen. It seems to me that we should not deprecate the testimony of the witness just because he is not picking out some recent storm in the State of Ohio.

Mr. Kinnison: The history of Ohio would show the worth to the Ohio Bell of this feature.

The Witness: Shall I finish that answer?

Mr. Burr: May we proceed, Your Honor?

Commissioner Poor: What is the question?

Mr. Burr: We were still at Medill, Oklahoma.

Commissioner Poor: I think he may answer.

Mr. Kinnison: Exception.

The Witness: On the arrival of this information at Chicago, the design in complete specification detail of the new installation was prepared. It involved day and night work.

The installation involved seven sections of switchboard, chief operator's desk, wire chief's desk, power plant, and of course all of the cable and so on, to complete the installation. The filling of the order was rushed in the same fashion and the boards were shipped by express to Medill, Oklahoma. At the same time a force of 30 installers was assembled at that point. Now this fire, as I said, took place on December 18th.

On December 25th that board was ready for service. Now that was a substantial advantage, not only to that company but to the community which was served by the switchboard.

A very similar instance occurred in the preceding year, in [fol. 9559] March, at Cheboygan, Michigan.

Mr. Kinnison: I object to the testimony as to the Michigan plant.

Commissioner Poor: It is overruled and you may have an exception.

The Witness: There were six sections involved at that point and the auxiliary apparatus in the same fashion. It was five days from the time of that fire until the board was not only installed but 50 per cent of the subscribers were actually working.

That sort of service cannot be rendered unless you have an organization like The Western Electric Company behind the telephone company that is involved, and it is just as liable to come in the State of Ohio as it is in any other State of the Union.

Mr. Kinnison: I move to strike out the answer.

Mr. Burr: That last sentence may go out.

Mr. Dotson: As a matter of information, how many stations did the Medill, Oklahoma, exchange have?

The Witness: I cannot answer that specifically. There were four sections of toll board. There were two sections of farmers' lines, and then there was one section of local subscribers' boards.

Mr. Dotson: It is what you would consider a small exchange?

The Witness: Oh, yes.

Mr. Dotson: Is the same thing true of the Cheboygan, Michigan, exchange?

[fol. 9560] The Witness: Yes, sir.

Mr. Kinnison: Do you have any similar instances in Ohio?

The Witness: I know of none.

Q. Do you know of the flood which occurred in this vicinity?

A. Yes, sir, I do.

Q. Do you know anything about the work done by The Western Electric Company?

A. I know that supplies were poured into this territory from the distributing houses that surround the area and in that way the supplies were on the ground more quickly than could possibly have been furnished through any other arrangement.

Q. Have you made an investigation of the services of The Western Electric Company in connection with sleet storms?

A. Yes, sir; I had occasion to make investigation only last month on a very serious storm that went over the Eastern Seaboard.

Q. Describe it briefly?

Mr. Dotson: I object on the same ground.

Commissioner Poor: Overruled.

Mr. Dotson: Note an exception.

The Witness: This storm took place on March 10th to 12th. It started in in Western Pennsylvania and West Virginia and continued eastward and finally struck the New England States at the last of the dates mentioned.

The first company to suffer seriously was The Chesapeake & Potomac group which operates West Virginia and Virginia and around Washington.

[fol. 9561] Q. Formerly extended into Ohio, didn't it?

A. I don't know to what extent damage was done here.

Q. I mean the Chesapeake & Potomac lines formerly extended into Ohio, did they not?

A. I cannot answer that. Washington would have been isolated if it had not been for the cable circuits going underground between Washington and Philadelphia, and in order to ascertain the extent of damage and make plans for the relief of the territory west of Washington communications had to be routed through Chicago and New Orleans and Atlanta. I happened to be in Washington at The Western Electric Company's distributing house there the seventh day after that storm. That was on March 18th that I was there. They had already shipped to the storm area these quantities of supplies——

Q. Shipped where?

A. Shipped to the telephone companies for the repair of this storm damage.

500,000 pounds of bare copper wire; 12,000,000 feet of twisted pair wire; 8,000 pounds of tie wire; 100,000 sleeves for connecting up the line work; 10,000 poles, and 2,500 cross arms.

When a storm of that character occurs roads are blocked and of course the service is destroyed. The first conditions that the telephone company must meet are the restoration of the roads and service and in order to do that it is done in a very temporary fashion. This twisted pair wire which is shown as having been shipped to the extent of 12,000,000 [fol. 9562] feet is a very important item in that respect

because that can be connected in at the good ends of the break and just simply strung along the fields or in the road and service given in that way.

In order to get a measure of what this damage meant in the way of supplies furnished I had recourse to the estimates which this company had furnished The Western Electric Company in January preceding showing that their annual requirements were going to be, and their best estimate for the year 1924.

Mr. Gentsch: May I inquire, do you mean the A. T. & T. Company?

The Witness: No, this is The Chesapeake & Potomac Telephone Company. I found that these annual estimates and the quantities shipped on this particular storm bore this relation to each other:

Of the bare copper wire shipped, 50 per cent of their annual requirements; of the twisted pair wire, 58 per cent; of the tire wire, 53 per cent; of the sleeves, 50 per cent; of the poles, 60 per cent; of the cross arms, 10 per cent.

And at that time there were 25,000 stations out of service and the estimated expense of repairing this damage amounted to $750,000.00.

However, that was not the only point that was involved in damage, because The Bell Telephone Company of Penn- [fol. 9563] sylvania and The New York Telephone Company were also involved in it. But, as usually happens in the case of sleet storms, there may be quite a difference in the extent of damage due to the amount of sleet that is formed on wires and the loss was not so severe in their territory.

However, these amounts of supplies were shipped to those companies; that is, for the States of Pennsylvania, New York, Connecticut and New Jersey:

Bare copper wire, 744,000 pounds; twisted pair wire, 9,000,000 feet; tire wire, 3,000 pounds; sleeves, 303,000; poles and crossarms are not reported.

Now The New England Telephone & Telegraph Company operating in the New England States exclusive of the State of Connecticut came in at the end of this period. They got the storm last and it was severe in their territory. The damage there amounted to over $900,000.00, and the stations out of service were 67,706.

I made a study and found out the service which The Western Electric Company had rendered to The New England Telephone & Telegraph Company. I found that they

had shipped as emergency needs the week following this storm the following amounts of material:

Bare copper wire, 151,000 pounds; twisted pair wire, 15,000,000 feet; tie wire, 2,000 pounds; sleeves, 189,000; [fol. 9564] poles, 1000; cross arms 6000.

In that case also I reviewed the requirements which The New England Company had given the Western Electric Company as their probable use for the year 1924, and I found that the relation to the emergency shipments was as follows:

Bare copper wire, 37 per cent of the annual requirements; twisted pair wire, 30 per cent; tie wire, 27 per cent; sleeves, 26 per cent; poles, 4 per cent; crossarms, 5 per cent.

Now there are two things that are very prominently to be noted in this connection. First of all, the amount of supplies could not have been produced had it not been for the arrangement such as The Western Electric Company has.

Mr. Dotson: Your Honor, that statement, it seems to me, is subject to objection—"could not have been procured without such a contract."

Mr. Burr: He did not say without the contract.

Mr. Dotson: Read it. I want it corrected understood.

(Answer read).

Mr. Dotson: I am substantially correct.

Mr. Burr: That is not the contract at all. That is the [fol. 9565] arrangement for keeping supplies at different points for use in emergency.

Mr. McConnaughey: Under the contract.

Mr. Dotson: That is what you claim for it.

Mr. Burr: They keep them whether it is under the contract or not.

Mr. McConnaughey: If it is not under the contract it is not here.

Mr. Burr: We do not insist upon it.

Mr. Dotson: Then let us have it out.

Mr. Burr: Take it out.

The Witness: The Western Electric Company is the largest supplier of these lines in the world and these companies were enabled to get this prompt service by dealing with that source of supply. Furthermore, they were not in competition with each other. Here were five companies that were involved and if they had all had their own pur-

chasing organization they would have all been competing against each other under conditions of emergency and the prices of these items would have been high and the service would have been very uncertain.

Mr. Dotson: I am very much impressed with what you are saying because of its peculiar character. But it is really arguing the case. It is not testimony in its nature at all. He is arguing to this Commission the very point that he ought to be making by the testimony. I object to it because of that. It is just the very thing that a lawyer would say to the Commission if presenting a case in argument. I think [fol. 9566] his comments are objectionable. He has stated the facts, what he did, and that is sufficient. The rest of the matter is argument.

The Witness: The prices which were paid for all of these supplies were those that applied under the contract, that is to say, the cost to The Western Electric Company plus the service charges to which we have already referred in the evidence. There was no increase due to the fact that this was emergency service; and the supplies were available and were shipped as needed.

By Mr. Shuler:

Q. Were there any independent companies in that territory, Mr. Cox?

A. Yes, sir.

Q. Do you know anything about how soon they were in service?

A. I have no information about them at all.

Q. Do you know whether or not they did get copper wire, cross arms, etc.?

A. They got it ultimately but I know they could not have gotten it as rapidly as——

Q. Not what you know——

Mr. Burr: Let him finish the answer.

Q. How do you know?

A. Because my general information is to that effect in studying the supply question. I know that this condition has been reproduced in storm after storm, and while I have not made the investigation of independent companies for these storms I have in other storms and I know they have trouble in getting their supplies.

[fol. 9567] Q. What do you know about how soon the in-

dependent companies were back in service in these particular storms?

A. I made no investigation.

Q. What right have you to say to this Commission that you know they could not have done it?

A. Because my general information leads me to that opinion. It is an opinion based on general information.

Q. What general information?

A. I made investigations of this kind as to the rapidity with which the independent companies got their supplies.

Q. Of the independent companies?

A. Companies that——

Q. What companies?

A. The Fire Alarm Companies in the State of Massachusetts.

Q. Are they telephone companies?

A. They are handling the same class of equipment.

Q. I did not ask you about fire alarms or sprinkler systems. I am asking you about telephone companies. What independent telephone companies have you ever investigated to find out how quickly they were rehabilitated after a storm such as you have testified to?

A. I do not think I can give you a name.

Mr. Shuler: That is all.

By Mr. Burr:

Q. Tell the Commission what the position of the State of Ohio is with reference to the sleet storm belts of the United States?

A. This is in a section where you can regularly expect having a serious sleet storm at least once in three years.

[fol. 9568] By Mr. Kinnison:

Q. Why don't you have the facts present showing the history of Ohio in this case?

A. I can do that if you wish in a general way.

Q. I object to the question awhile ago on the ground that you had no history of these casualties.

A. I understood you to refer to fire casualties.

Q. You do have records of other casualties?

A. I have a summary that will show the situation as developed by our engineering department.

By Mr. Burr:

Q. Produce it, if you please?

A. May I have the map in front of you?

Q. I hand you a map marked "Sleet Storm Map."

A. Yes.

Mr. Burr: It may be marked for identification Cox Exhibit No. 18, and it is offered in evidence.

And thereupon the Document above referred to was marked for purposes of Identification as Cox Exhibit No. 18.

Q. Explain it to the Commission, if you please?

A. This is a map prepared by the engineering department of The American Telephone & Telegraph Company showing, by the insertion of specially colored pins, the location of the serious sleet storms over a number of years.

Mr. Kennison: That does not show specific years or specific damage done in Ohio? What is that, a general chart? [fol. 9569] The Witness: It is a general chart, yes, sir. It is simply a pin map showing the recurrence of sleet storms and designating their severity.

Q. Is there a key to the map?

A. Yes, sir, there is a key to the map, and, roughly, the darker the pigmentation the more severe the storm area involved.

By Mr. Kennison:

Q. That is taken from the records of The A. T. & T.?

A. Yes, sir.

Q. Are the records of those sleet storms available?

A. I presume so.

Q. You haven't got them?

A. I haven't got them. These were not prepared by me. This was furnished by the engineering department.

By Mr. Dotson:

Q. Over what period of years does that study extend, if you know?

A. I don't know, but my understanding is it goes back 15 or 20 years. It is a long period.

Q. How recent a date is that brought to, if you know?

A. This map first came to my attention last year and while I don't know that it was prepared then I am reasonably sure that it is within a year or two.

Q. It was not prepared under your direction?

A. No, sir.

Q. You don't know under whose direction it was prepared?

A. I know it was prepared by the engineering department.

Q. Of the A. T. & T.?

A. Yes, sir.

Mr. Burr: It was prepared, Mr. Dotson, on August 1st, [fol. 9570] 1920, in its original form and has been corrected from time to time since, if you will take my statement for it.

Mr. Gentsch: We will take your testimony. You are the best witness any how.

Mr. Dotson: What change do you claim has been made in the map since August, 1920?

Mr. Burr: That is what I cannot tell you. But we will endeavor to find out for you.

Mr. Gentsch: We want to object to the introduction of this map. It is clearly apparent from this man's testimony that he had nothing to do with it. He has no personal knowledge of it. It was prepared by some one else. He has no knowledge how, when or where.

Mr. Shuler: Is Mr. Cox to be here next week?

Mr. Burr: It makes no difference to us whether the map goes in.

Commissioner Poor: The objection is well taken. I was under the impression it was produced in response to a question of Mr. Kennison.

Mr. Kennison: I was asking for facts and records, the records of the company.

Commissioner Poor: It is not responsive to your question. The objection to the introduction of the map at this time is sustained.

Mr. Shuler: Is Mr. Cox to be here next week?

By Mr. Burr:

Q. Mr. Cox, has the Ohio Bell Company all of the vouchers of the Old Ohio State Company for purchases made?

[fol. 9571] A. They are available.

Q. For a period of how many years?

A. I don't know how many years back. I have only confined my attention to the recent years.

Q. How far back?

A. 1919 and '20. I will have to refer to the study to get it exact. 1919 and 1920.

Mr. Burr: You were asking about Mr. Cox's return. As I understand it, this concludes the hearing for this week, and the first four or five days of next week are assigned for the same case. Mr. Anthony will be here for cross-examination. Mr. Schneider likewise and Mr. Kositzky and I do not know whether Mr. Cox can return or not at that time, but we will ask him.

Mr. Dotson: I doubt if we will be prepared to cross-examine him next week. We will want a transcript of his testimony first.

Mr. Burr: Is it the understanding then that the cross-examination of Mr. Anthony and Mr. Schneider and Mr. Kositzky will proceed next week?

Mr. Shuler: Yes, so far as I am concerned.

Mr. Burr: Those are the only three you want next week?

By Mr. Shuler:

Q. Can you tell us where the warehouses of the Western Electric are located in the United States?

A. Boston—I will refer to the ones that deal specifically with, whose sole function is to serve, the Associated Companies. You see they have two classes. They have warehouses that are primarily established to deal with the gen- [fol. 9572] eral trade.

Mr. McConnaughey: There is one in Columbus; is that for the general trade?

The Witness: Yes, sir.

Mr. Gentsch: You did not prepare any comparative statement——

Mr. Shuler: Wait until he answers me.

The Witness: I haven't finished yet. I wanted to read it. If I can't find it I will give it to you from my own memory. I do not seem to have it here.

Boston, New Haven, New York, Philadelphia, Pittsburgh, Washington, Savannah, Atlanta, New Orleans, Nashville, Cincinnati, Cleveland, Indianapolis, Chicago, Minneapolis, Omaha, Des Moines, St. Louis, Dallas, Oklahoma City, Denver, Los Angeles, San Francisco, Portland, Seattle, and Spokane. There ought to be 32 of them. If you

will count them I can see whether it is correct. Their main supply housing manufacturing point is at Hawthorne.

Q. Have you prepared any exhibits showing the costs to the Western Electric Company of manufacturing any articles?

A. No, sir.

Q. Can you give us that?

A. I haven't that information available.

And thereupon the further hearing of this matter was adjourned to Monday Afternoon, May 26th, 1924, at 1:30 o'clock.

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[fol. 9573] And also W. T. ANTHONY, resuming the stand for further cross-examination, having been heretofore duly sworn, continued his testimony as follows:

Cross-examined by Mr. Dotson:

Q. Mr. Anthony, you were answering the series of printed inquiries that were submitted for you to answer and you had proceeded I think down to No. 4, or possibly you had finished with No. 4, of the details and supporting dats of the single ticket toll operating method.

A. That is right, yes, sir.

Q. There are a few other questions that followed; if you will, take them up now and finish them.

A. Shall I continue as I started?

Q. Just continue in the same way as you started.

A. Question. Who, if you know, originated what is known as the fast manual, similar to your No. 1 C, that is having multiple lamp signals and feature cords?

Answer. I have never heard of any board in particular being designated as the fast manual. A switchboard is as fast as the number of operators who are placed at the switchboard makes it, so far as the speed of answer is concerned.

Q. Have you any particular name or designation for this fast manual board, or rather the lamp signal feature cords service, of your own? Is there any particular term [fol. 9574] you give that?

A. No, I don't know just what it is.

Q. Do you know anything about this service that was originated by the Kellogg people?

A. Well, I know of Kellogg boards of various types but I have never heard any of them designated as fast.

Q. Well, laying aside the word "fast", whether it is called that or not, I refer now to a fast manual board similar to your No. 1 C—if it isn't a fact that the Kellogg people were the early developers and originators of such a method or system, whatever you want to call it?

A. It is my understanding that the first board of the type known as our 1 C was developed by the A. T. & T. Company.

Q. Isn't it a fact that the Kellogg people developed the fast manual similar to your No. 1 C?

A. Well, the Kellogg Company have different types of boards. If you mean a board similar to our 1 C so far as machine ringing cord circuits are concerned, it is my understanding that the Kellogg people manufacture such a switchboard. That is, they have a type of machine ringing cord circuit.

Q. The machine ringing cord circuit, does that have a lamp signal, do you mean, or multiple lamp signal.

A. I know of Kellogg boards that have lamps associated with multiple jacks and I know of Kellogg boards that have separate answering jacks. We have both types of those boards in our territory.

Q. Do you know that it is a fact that the Kellogg people [fol. 9575] did develop a multiple lamp signal and feature cords for the telephone service?

A. I don't know anything about the Kellogg developments, Mr. Dotson.

Q. You could not say anything about that?

A. I could not.

Q. So you would not be able to say whether they did or did not develop a multiple lamp signal and feature cord?

A. No, I could not say anything as to the development of the board. I know that we have in our territory Kellogg boards but I do not know who developed them.

Q. Now, for the purpose of the record, will you tell us what a multiple lamp signal and feature cord is like; what is the character of it; what purpose does it serve?

A. You have in mind now, I presume, a switchboard where a lamp is associated with each multiple jack?

Q. Yes, in which it uses multiple signals; that would be several lamps, would it not?

A. Yes, we have what we call multiple lamp boards of various types. We have boards where part of the signals—answering jacks—are multipled. We have boards where all of the answering jacks are multipled.

Q. Well, the purpose of the multiple lamp signal is to enable several operators to answer the same call?

A. That is right.

Q. That facilitates the placing of the call, does it not? That is, the operator that is at leisure can answer it promptly; it don't depend on one operator alone?

A. I would not say that it made for a prompter answer [fol. 9576] when there is more than one appearance of the answering jack; it is a question of providing sufficient operators under either system to provide a prompt answer.

Q. Well, the multiple lamp signal is now in general use, is it not, especially in all large exchanges?

A. Oh, I would not say that, no. Answering jacks are multipled where a case can be proven for an additional investment in equipment.

Q. What are the conditions that you have in mind in the answer you have just given?

A. Oh, there are several conditions, Mr. Dotson. One factor is whether you want to sacrifice subscriber's multiple jack, I suppose. Another factor is the calling rate per line. Those are the two main factors.

Q. Well, now, what would be the conditions that would cause or prompt the company to be willing to make the sacrifice you speak of for the use of the multiple lamp signal? You say if the company felt ready and willing to make the sacrifice of certain equipment there——

A. Well, that is a matter of cost.

Q. Isn't it a matter of service too?

A. No, as I see this question it is purely a matter of cost. If the multiple requirements in an office justify the space regularly allotted to subscribers' multiple, the provision of multiple answering jacks would make it necessary to trunk calls to multiple appearing in another board.

Q. Has any variation in the calling rate in the various classes of subscribers anything to do with the use of the [fol. 9577] multiple lamp signal?

A. Yes.

Q. In what respect?

A. Well, the higher your calling rate, the less answering

jacks per panel to give an operator a load. That means that with a high calling rate primary answering jacks and multiple answering jacks can be provided in less space than where you have a low calling rate. Also, the multiple jacks provided are of more use for the reason that more calls per jack are originated.

Mr. Dotson: Will you please read that answer?

(Answer read.)

Q. You may take up the next question.

A. Question. Who developed and owns the fundamental patent on automatic coin collectors?

Answer. I presumed this question has reference to the prepay coin box service which I referred to in my direct testimony. Information on the matter of prepay coin boxes is furnished the Ohio Bell by the A. T. & T. Company. It is my understanding that the A. T. & T. Company developed equipment that is used fir prepay coin box service in connection with The Gray Telephone Pay Station Company. It is also my understanding that the A. T. & T. Company owns or is licensed under several patents relating to this matter.

Q. You do not know of your own knowledge that that is the case, do you?

A. Not directly.

Q. You do not know under what patents they have developed that service nor the date of it?

[fol. 9578] A. No, I do not. I have seen the patent numbers and the dates, but I have no record of it here.

Q. You may take the next.

A. Question. Who owns and developed the fundamental patent on the motor generator ringing equipment?

Answer. I presume this question has reference to the machine ringing B trunks referred to in my testimony. Information regarding machine ringing B trunks are furnished the Ohio Bell by the A. T. & T. Company, and it is also my understanding in this connection that the A. T. & T. Company now owns or is licensed under a number of patents relating to this development. I think Mr. Allen covered this matter in his testimony.

Q. In your testimony, Mr. Anthony, on Page 987, you stated, in response to the question, "What is traffic engineering as applied to the telephone business?", "Traffic

engineering as applied to the telephone business has to do with the providing of methods and equipment for the handling of traffic, that is, local traffic and toll traffic." I would like to have you make more specific what you meant by that answer as to providing methods and equipment for handling of traffic, if you will.

A. I had this in mind, Mr. Dotson. If a new central office is required in a certain exchange the traffic engineer is responsible for determining the amount of equipment required to serve that office for an economical period, and also for estimating the requirements for a 15 or 20 year period for the purpose of the proper design of building and the [fol. 9579] selection of the proper type of equipment. The same requirements obtain in connection with the toll equipment. The traffic engineer is also responsible for initiating recommendations for the proper amount of traffic and equipment between various offices in an exchange area. I have in mind inter-office trunking equipment. He is also responsible for determining the toll circuits required between various exchanges in the territory. All of these items are recommended by the traffic engineer for an economical period.

Q. Now, the traffic engineer—the traffic department, as I take it in connection with your former answer, if I understand your answer, relates to new developments, for instance, new exchanges or new toll service; in fact, in pioneering the plans and specifications and the character of the equipment to be installed and operated in new plant and in new toll lines. Now what, if anything, has the traffic department to do in the line of your work with established businesses, a built-up operating plant?

A. Oh, I did not mean to imply that we were concerned only with new offices. The traffic engineer is also responsible for recommending additions and changes, additions to and changes in existing equipment.

Q. I would like to have some idea, Mr. Anthony, of the traffic organization maintained in Ohio, first of all in the State headquarters, of which I understand you are the head and of which you are in charge. You are the chief traffic engineer of the Ohio Bell Company?

A. My title is general traffic engineer.

[fol. 9580] Q. What organization do you maintain in the department at Cleveland for the State-wide business of the company?

A. Now you have in mind traffic engineering only and not the operating end of the traffic department?

Q. Well, I refer primarily, first of all, to the traffic engineering of the department.

A. In answering that question I might cover in a general way the division of the duties between the general traffic engineering office and what we call the field people.

Q. Very well, you may do it in that way.

A. The general traffic engineer is responsible for recommending additional equipment and changes in existing equipment as required in our common battery offices. That includes local central office equipment, toll central office equipment, inter-office trunk equipment, toll line plant, operators' quarters equipment, estimates in connection with building requirements, in connection with cable requirements, and of course all the necessary fundamental studies that are made for plants which the company has in mind. That is, we work in connection with the chief engineer's office in connection with study work.

Q. Now, your statement then is a brief and general statement of the duties and responsibilities of the general traffic department?

A. That briefly covers the matter.

Q. Your department then does nothing in the field; it has no part in the operating end of the traffic business?

A. No, we have no direct responsibility in connection with [fol. 9581] the operating end of the business. It is necessary of course for us to keep in close touch with the operating people and have their viewpoint in mind as that controls to a large extent the engineering of equipment.

Q. You exercise then some degree of supervising direction of the operating traffic department?

A. No, I would not say that I have any direction of the operating department at all. The direction of the traffic department is under the general superintendent of traffic and the division traffic superintendents. My——

Q. Who is——

Mr. Burr: Wait a minute. Let him finish, please.

The Witness: As I said before, my main connection with the operating end of the traffic department, and I mean by that the department charged with the handling of traffic is in connection with engineering matters.

Q. Yes, I understand. Now who has charge of the operating traffic work?

A. Well, Mr. J. F. Carroll is general superintendent of traffic and is in charge of the entire traffic department, including my unit.

Q. Then do we understand that the traffic department consists of two general divisions; one is the general traffic department that you have briefly described you are in charge of——

A. General traffic engineering.

Q. General traffic engineering, and also the general operating department?

A. That is right.

Q. And is there any person in charge of the operating [fol. 9582] traffic department occupying a position in that respect similar to yours in the general traffic work?

A. Mr. Carroll has reporting to him four division traffic superintendents.

The Ohio Bell territory is divided into four divisions, the Northern Division with headquarters at Cleveland, the Western Division with headquarters at Toledo, the Southern Division with headquarters at Columbus, and the Dayton Division with headquarters at Akron.

Each of those Divisions is headed by a division traffic superintendent.

In addition, Mr. Carroll has reporting to him a general supervisor of traffic who is an adviser on operating matters, and a general supervisor of toll traffic who is an adviser on toll matters. These two men are responsible for developing methods in connection with the operating end of the game and they deal with the division traffic superintendents in connection with problems that arise from time to time, and quite frequently go into the territories of the various division superintendents and assist them in connection with specific problems.

Q. Going into the various fields, traffic subdivisions in operating work, no part of that have you to do with whatever; you do not go into the various fields where they are in operation and deal with their problems direct at all, do you?

A. Only the engineering, traffic engineering problems but not the operating problems, no.

Q. Then as we understand it, it is the work of the traffic [fol. 9583] department to plan all of the methods, all of the

equipment and requirements for each exchange and exchange area where such work is required?

A. That is right.

Q. And then you have your operating traffic division in charge of various sections of the State, that is, of certain exchanges in certain sections of the State, who carry out these instructions and these plans and instal them wherever that is required throughout their territory?

A. That is general is right, but I might say that my assignment makes it necessary for me to keep in touch with the operating people, as I said before, so that the engineering may conform to the viewpoint of the operating people.

Q. Now, the traffic department located at Cleveland of The Ohio Bell Telephone Company, in charge of—did you say Mr. Carroll or Mr. Harris?

A. Mr. Carroll.

Q. Is responsible for all of the traffic engineering work for the Ohio Bell Telephone Company throughout the State except in the Cincinnati area?

A. That is right, and of course there are connecting companies in Ohio over which we have no jurisdiction.

Q. All of the various exchanges and traffic areas of The Ohio Bell Telephone Company which you have mentioned handle their traffic business under the direction of the Ohio Bell traffic department at Cleveland? In other words they are all under the supervision and direction of the department at Cleveland?

A. You have in mind the four divisions that I mentioned?

Q. Yes, I have in mind those?

[fol. 9584] A. That is right.

Q. Yes. If any of those sections have any traffic problems that their own local engineers are unable to handle they seek the advice and assistance of the State traffic department?

A. That is right.

Q. Do any of these local areas of these four divisions have local traffic organizations of their own corresponding to the one at Cleveland for the State Company?

A. Each division traffic superintendent has reporting to him district traffic men in charge of various districts in the divisions, and then other men who are assigned to supervisory work and to field traffic engineering.

Q. How many traffic engineers have you at Toledo in the Toledo divisions?

A. We have a division traffic engineer at Toledo.

Q. Is that all you have, just a division traffic engineer?

A. The division traffic engineer has some clerks in his organization. Right now at Toledo, Mr. Dotson, is more of less of a special organization that has been built up to carry on the consolidation work.

Q. But normally speaking now, in the Toledo division, what would be the personnel of a traffic department for that division?

A. A division traffic superintendent, a district man for each district, a man assigned to supervisory work and a man assigned to traffic engineering; also a toll specialist.

Requirements vary in different divisions and vary at different times dependent on the number of problems they [fol. 9585] have. The entire traffic department of the Ohio Bell is flexible. Men are transferred from one division to the other to meet the requirements and problems as they come up.

Q. Well, Mr. Anthony, for instance in the Toledo exchange area, there is in your financial report every year, your annual financial report, an item called "traffic expense", and it usually is a considerable sum as compared with the other items of expense; can you tell us just what particular items are included, what particular items of expense are included under the traffic item, so that we will have some idea of what you are referring to?

A. I am not familiar with the statement you are referring to, Mr. Dotson.

Q. You could not give it to us in any definite detail?

A. No, not without seeing the statement and checking to see what it is made up of.

Q. Well, is the statement only carries the one item, traffic, and the sum total of that item, that would not disclose anything to you? You would have to have other means of information, would you not?

A. I do not know just what statement you refer to.

Q. I said in the annual financial statement of the company published broadcast and filed with the City Clerk of Toledo.

A. I have never seen a statement of that kind prepared for specific exchanges. I have seen the statement for the entire company.

Q. Well, your statement, for instance, divided into maintenance cost and traffic cost, and general cost, etc., com-

mercial cost, does not disclose any other subdivisions of [fol. 9586] items. Take, for example, the item of maintenance cost.

Commissioner Poor: Mr. Dotson, I do not like to interrupt, but hadn't you better put on the man who knows about that and ask him?

Mr. Dotson: I will withdraw that last question. I thought maybe this witness might know.

Q. Now, in another place you testified, speaking of The American Company furnishing you practices which you used in connection with your toll line engineering, that the practices are "We consider *of* the best available". Upon what do you base a statement of that kind?

A. I base that statement on my experience with various practices. I have seen practices that were developed by individuals and seen practices that were developed by companies, and the practices which have been developed by the A. T. & T. Company I consider from my experience the best available.

Q. How do you arrive at an opinion of that kind? Are we to understand that you make a comprehensive study of the practices and suggestions and methods published and offered by the A. T. & T. Company with the methods and practices of other companies in order to determine the superiority of the A. T. & T. methods, suggestions and practices to those of others?

A. No, I do not have that in mind. The way I feel about the A. T. & T. practices, I would not consider it necessary to go out and check other practices, because I have been using them long enough to have sufficient confidence in them to apply them and we know from the results that we get that they are very good.

[fol. 9587] Q. Then you have not made any comparative study at all of the practices of the A. T. & T. Company with those of the independent companies? You just base that, as you have said, on the long use you have made of the A. T. & T. practices which have proven satisfactory to you, and upon that you base your opinion that they are satisfactory?

A. I also stated that I have seen practices developed by individuals and developed by other companies and that is one of the reasons why I feel that the A. T. & T. practices are the best.

Q. Have you used any developments of any other agency than those of the A. T. & T. Company?

A. Yes; during the receivership of the Central Union Company quite often practices were developed by individuals.

Q. By whom?

A. By various individuals in the organization.

Q. Well, that was in the Central Union Company organization?

A. During the receivership.

Q. Well, that was an Associated Company of the Ohio Bell, was it not?

A. Yes, it was.

Mr. Burr: Just let me ask you one question. Did it have the benefits of the license contract during the receivership?

The Witness: We used them. We used a great many of them. But during the receivership the organization was run a little differently and we were not in as close touch with the A. T. & T. Company as we are now.

Mr. Burr: That was because one of the receivers was from [fol. 9588] the independent field?

The Witness: That is one reason.

Mr. Laylin: I move that that be stricken out.

Q. Were you with the Central Union at the time it was under the receivership?

A. Yes, sir.

Q. Where were you?

A. Chicago.

Q. Of course you know that the Central Union was operated by receivers under the Court's orders?

A. I think so.

Q. And that those receivers just simply conducted the business with the equipment that they had on hand and only utilized additional equipment where it was absolutely necessary and directed by the Court?

Mr. Burr: Just a moment. Are you making that as a statement of fact?

Mr. Dotson: No, I am just asking the question. I am just doing what you have done in the past.

Mr. Burr: Let us see if you are.

(Question read.)

Mr. Burr: That certainly goes far enough and the question has four or five different barrels and it seems to me that it ought to be at least separated.

Mr. Dotson: I am not through yet.

Q. Now in view of that fact——

Mr. Burr: I object to the question.

Mr. Dotson: I made that statement to base a question on.

Mr. Burr: The point is that you are stating something [fol. 9589] as a matter of fact. For example, you have just said "in view of that fact", and it is not a fact anywhere in this case and I am objecting to it because you are assuming something which is not shown by the testimony.

Mr. Dotson: Well, there are a lot of things testified to that are not in the record in this case, but they get in there because they are testified to.

Mr. Burr: I am objecting to the question.

Commissioner Poor: I have not heard the question yet.

Mr. Dotson: Now the question is, in view of that fact——

Mr. Burr: I object to that. You are stating a fact and then saying " in view of that fact"; you are testifying when you do that.

Mr. Dotson: I think, Your Honors, when a receivership is testified to—the witness called attention to the fact—that Your Honors will realize that the statement is a true and correct statement of a fact that would exist and prevail under certain circumstances. It is not outside of the fact. I wanted to propound a question "In view of that fact". Now if Mr. Burr can show wherein the statement that is the basis of the question is contrary to the fact, alright.

Mr. Burr: I say this, Mr. Dotson, that you are too good a lawyer not to know that you are not entitled to state anything in this record as a matter of fact. You can not testify except under oath. You cannot testify except through [fol. 9590] the medium of a question. If you consider that what you said in your question represents the fact, then suppose you state your question hypothetically, assuming those to be the facts, but not stating them as a fact, as you have no right to do. I am going to object here just as long as you continue to frame your question or statement, whichever it may be called, in the way that you have.

In the first place, I think you have stated some things as a matter of fact which, apart from the fact that they are not anywhere in this record, are not true in point of fact.

Mr. Dotson: You get too many facts in here and we will be all muddled up yet.

Commissioner Poor: Now we have got down to the place where we haven't any question yet.

Mr. Dotson: Just strike out what I have said.

Q. Assuming what I have stated to be a fact——

Mr. Burr: Now assume what you want to assume.

Q. Assuming what I have stated to be a fact, do you consider that the criticism that you have made upon the results of operating the Central Union Company by the receivers is a fair means by which you are justified in arriving at the conclusion that the A. T. & T. methods are better than any other known methods and practices?

Mr. Burr: I object.

(Question read.)

Commissioner Poor: I think that is proper cross-examination. He has made the statement that he considered the [fol. 9591] A. T. & T. methods the best, and this calls for the basis of his opinion.

The Witness: In the first place, I did not mean to criticize the operation under the receivership. I simply stated that during my service with the Central Union Company while that company was operating under the receivership I knew of the cases referred to, but that is not my only reason for considering the A. T. & T. practices to be the best. I have also had some experience with methods in use by an independent company, and based upon that experience I think the A. T. & T. practices are the best.

Q. What company was this now that you refer to?

A. The Ohio State Telephone Company, which was an independent company.

Q. What means of knowledge have you of their methods and practices that you referred to?

A. Well, I knew the methods that were in effect when that company was merged with the Ohio Bell.

Q. Well, let us get a little more definite. What methods were there that you refer to now?

A. Well, in my direct testimony I think I cited a case where there was considerable waste of operators for the reason that the force was not adjusted to the fluctuation in traffic, and that the Ohio Bell Company takes care of that

by means of Traffic Circular No. 117, which is an A. T. & T. method.

Q. Now that case you refer to was in Cleveland?

A. That is right.

Q. That is the only case you know of that you recall [fol. 9592] now and by which you seek now to justify the opinion that you have expressed on this superior method of the A. T. & T. Company as compared with the independent company?

A. No, no, I cited that case because I happened to be located in Cleveland and was closer in touch with that situation than the others, but a similar condition obtained in the other exchanges in the State. They had no definite method of adjusting the operating force to the fluctuation in traffic. There was no method in use except the judgment of the chief operator.

Q. Do you know whether or not The Cuyahoga County Telephone Company had an observation board in operation, a service observing board, I should say?

A. They had an equipment in the downtown office from which they could dial various positions in the city but they had no service observing board similar to the service equipment used by the Ohio Bell Company.

Q. What they did use was for the same purpose, was it not; just a different method from the one you described; isn't that true?

A. They did not get the complete story on the call for the reason that they were not connected to a subscriber's line. They were connected to an operator's position and they could not follow the progress of a call from the time it was originated until it was completed because they were not on a specific line. They were simply on the head set of the operator.

Q. But that was the purpose of the board which they had in use, a service observation work that they were carry- [fol. 9593] ing on?

A. It was for that purpose, yes.

Q. Now the study you made at the time you mentioned in Cleveland in this respect was made at the time that you were reorganizing and taking over the Home Service of that city; that is, the Bell Company; you were making that investigation in order to determine the number of op-

erators that they should have and the distribution of the work?

A. As I recall it, it was shortly after they took over the operation, shortly after the two companies were merged.

Q. And that was a necessary study at that time in order to work out the plans that you had in view with reference to the operation of the new service?

A. Oh, no, that study was not made in connection with any plans for consolidation. That study was made by our operating people to determine whether or not the office was being operated as economically as it should be and whether or not the proper number of employes were provided each half hour period of the day in accordance with the fluctuation in traffic.

Q. Isn't it true that that was simply carried on as part of the general work which was being done in that respect by The Ohio Bell Telephone Company all over the state?

A. It was extending into the Ohio State offices methods which had been developed by the A. T. & T. Company and were in use in the Ohio Bell offices.

Q. And you were making a study of the independent phone service there for the purpose of installing these same methods that the Bell Company had adopted from the A. T. & T. Company?

A. In that particular case.

[fol. 9594] Q. Mr. Anthony, this study that you describe of the operating service is being carried on continually, is it not, on the part of the Ohio Bell Company?

A. You have in mind the adjustment of operating forces?

Q. Yes, the adjustment of the operating forces?

A. Yes, that is a regular operating routine now, to keep the operating forces adjusted to the traffic.

Q. Isn't it possible that between the time that The Cuyahoga County Telephone Company ceased operation and the Ohio Bell took it over and got it under control and got it reorganized in accordance with its general plans the proper adjustment of operating forces would get improperly proportioned and out of adjustment during that period?

A. If they had had a method for adjusting the force, the force might have gotten out of alignment during that period. However, they did not have a definite method in effect; the operating people of the Ohio State were not familiar with the methods used by the Ohio Bell Company

and there was no change made in the organization of this office I have in mind between the time that we took over the operation of the Ohio State and the time this study took place.

Q. Your first knowledge of the condition of the operating forces in the old Cuyahoga County Telephone Company was after the Bell Company took it over; isn't that true?

A. No, we were familiar with the situation before we took over the operation for the reason that we dealt with the Ohio State people some time prior to the consolidation.

[fol. 9595] Q. You say you had some dealings with them prior to the consolidation. What were the dealings you refer to? What was the character and nature of them?

A. We dealt with them to find out what records they were keeping, what the methods were; we were interested in those things from two angles, one the amount of data that would be available for general operating purposes and the data that would be available for consolidation plans.

Q. Does The Ohio Bell Telephone Company use any traffic methods and practices, any equipment originated and furnished by independent companies, or did the Ohio Bell Company use any such methods and practices prior to unification?

(Question read.)

Mr. Burr: Now do you include equipment in both barre-s of that question?

Mr. Dotson: I think it is clear. If it is not clear to the witness I will try and clear it up for him.

The Witness: Read it again.

(Question read.)

A. We have a board that was built by the Kellogg Company——

Q. What company?

A. The Kellogg Company; in service in the territory of the Ohio Bell Company prior to the consolidation.

Q. Where was that board located?

A. What I had in mind was Painesville.

Q. At Painesville?

A. Yes, sir.

Q. Is that the only independent telephone equipment [fol. 9596] which it used prior to the consolidation?

A. That is the only one I recall offhand. There may have

been others that were obtained through previous consolidations. I presume you have in mind by consolidation, the consolidation of the Ohio State and Ohio Bell?

Q. Yes, that is what I mean.

A. There may have been some others in smaller exchanges; I would not recall.

Q. What was the type of the board in Painesville?

A. That was a Kellogg board with machine ringing; it is a small exchange, few positions.

Q. How did the Ohio Bell acquire that board that you have just mentioned in Painesville? Was it one installed by them originally or acquired by them as a going concern?

A. That board was in service when I came to Cleveland and I cannot say definitely although I imagine it was acquired through a consolidation.

Q. Was that a multiple lamp board, do you know?

A. That board has the lamp signals associated with the——

Q. Was it multiple, that is multiple lamp?

A. It is a form of multiple lamp board, that is right.

Q. Are you still using it there?

A. Yes.

Q. Do you know how long it has been in use in Painesville?

A. No, I do not, Mr. Dotson.

Q. Did I understand you to testify awhile ago that the multiple lamp signal is generally in use over the state?

A. No.

Q. What did you say?

A. I said that we provided multiple lamp signals where [fol. 9597] we could prove them in from a cost standpoint, where they were economical.

Q. To what extent, if you know, is the multiple lamp signal used?

A. We have multiple answering jacks in some Cleveland offices, in some Columbus offices, and I rather think in some Toledo offices; I think one or two Toledo offices; also in Painesville.

Now when I refer to multiple answering jacks in Cleveland, Columbus and Toledo, I do not have in mind a lamp associated with each multiple jack, because an arrangement of that kind would not be at all practicable in the cities referred to at least. I have in mind where some or

all of the primary answering jacks, or what we call the first appearance, are multipled ones. Through the entire board there are two appearances. That is somewhat different from the Painesville arrangement.

Q. In what respect are those different from the Painesville board? What is the difference?

A. The difference, Mr. Dotson, is that in Painesville there is a lamp associated with every appearance of the subscriber's multiple. In the other cases referred to the answering jacks and subscriber's multiple jacks are separate. But we provide an additional appearance of the primary answering jacks. It would be impracticable to use what you call full multiple lamps in Cleveland, Toledo, Columbus and other cities for the reason that those boards are designed for small cities having not over 3000 lines.

Q. Why do you say the multiple lamp signal used in [fol. 9598] Painesville is not suitable for use in a large city like Toledo, Columbus, Cleveland and others?

A. For the reason, Mr. Dotson, where you provide a lamp with every multiple jack you double your subscribers' multiple and space requirements, and the boards that I am familiar with are limited to around 3000 lines. I think Mr. Brooks testified to the same thing in this case or in the Dayton case.

Q. Why does it prove in successfully in a 2, 3 or 4000 subscriber board and not in the other or larger board?

A. I do not think that multiple line lamps always prove in on the small boards. You may be able to make a case for them in the smaller boards where you have not more lines than can be terminated within reach of the operators, but when you get into a large office where you may want to terminate 8000 lines in front of your A operators, if multiple lamps were provided with each one of them you would have to provide a ladder for the operators to get up and make a connection.

Q. Your reason then is that the equipment would be too elaborate to be practical?

A. And costly. It would be impracticable.

Q. In your testimony in chief you referred to a general engineering circular No. 1200 and stated it was very valuable to the traffic engineers of the Ohio Bell Company, and further stated your reasons. Among them, to refresh your memory, was the reason that it covers in detail practically all of the practices necessary in connection with

[fol. 9599] the engineering of local and toll switchboard equipment, including the proper type of equipment to provide and the method of estimating future requirements.

Mr. Burr: From what page of the record are you reading?

Mr. Dotson: That is on page 1000.

Q. What knowledge had you of the information contained in this Circular 1200 before it was received by you from the A. T. & T.?

A. G. E. C. No. 1200 is a revision of General Engineering Circular No. 644. Now 644 was a revision of a circular which I think was No. 294, and it was in use in the Bell System when I entered the telephone business. 644 and 1200 are, as I say, revised, and replaced 294. They brought the information up to date and were made more elaborate; that is, covered more detail, etc.

Q. What new information matter did it furnish which was unknown to you prior to your receipt of it, anything?

Mr. Burr: To which number are you referring?

Mr. Dotson: No. 1200, General Engineering Circular.

A. Why, one matter is that 1200 elaborated very much on the methods of determining toll switchboard requirements and the design and layout of toll switchboard equipment. 644 and 294 referred to this matter but did not cover it in the detail that 1200 does. 1200 provides a section which is very much in detail—gives the typical ex- [fol. 9600] amples and is of great assistance to a toll switchboard engineer in engineering new switchboards or making changes in or additions to boards already existing.

Q. Your work as a traffic engineer had covered the entire field that was covered by this Circular 1200, had it not, so that you were somewhat familiar with everything that was set forth in that Circular? That is true, isn't it, Mr. Anthony?

A. That is true in a general way, that the A. T. & T. Company had furnished in previous circulars information which made me familiar with much of the information in 1200, and also during the period that No. 644 was in effect we received informally and in correspondence many of the items that were covered in 1200 when it was issued. That is, we keep closely enough in touch with the A. T. & T. and they keep closely enough in touch with us so that we have

a great deal of this information in advance of their issuing it in a circular of this kind.

Q. Well, now, the fact of the matter is, as you stated awhile ago, that Circular 1200 was just a compact statement up to date of all the data which you had availed yourselves of previously, so that it did not give you anything new, as a matter of fact?

A. Yes; for one thing, this toll set up gave us a great deal that was new. We did not have in detail—had never received in detail a toll section. If you will refer to 1200 you will find it covers a great deal of that.

Q. However, the detail that you speak of on the toll construction was nothing absolutely new. You simply had a [fol. 9601] little more in detail the manner of handling that subject than you probably had previous to that time, but there wasn't anything new about it, was there?

A. What do you mean by new, Mr. Dotson?

Q. Well, I mean that there was nothing in the circular that gave you any new ideas of engineering problems, no new solutions?

A. Yes, there are covered in that section new forms——

Mr. Burr: What section?

The Witness: In the toll section of 1200. New forms to be used in connection with estimating toll switchboard requirements, which gave us some new ideas, and since using them we have found that in addition to being more convenient than the methods we used before they make for more accurate engineering for the reason that they go into more detail.

Q. Well, now, the feature that you speak of only detailed in some respects the method of estimating cost which you had been accustomed to making all along? You had always been accustomed to making estimates of cost, had you not?

A. I did not have in mind so much the cost as determining the amount of equipment to be provided based upon past experience. It treats of the use of data collected in the past and with the prediction of that data also as to the lay-out of the equipment, that is the economical location of the equipment to handle various kinds of toll traffic.

Q. What I am getting at, and I think we can understand one another pretty quickly, the very thing you are referring [fol. 9602] to was nothing new to you? You had been ac-

customed to doing this work in a certain way. Now circular No. 1200 just gave you some suggestions, if I understand you correctly, of doing the same kind of work only in a little different form, but the same work had to be done?

A. It depends upon what you mean by "in a little different form". It is true that we did similar work before getting 1200, which was based upon an A. T. & T. Circular numbered 644 and information which we received informally or in correspondence. But 1200 gave us some new ideas and gave us some ideas that work out to our advantage in engineering this equipment.

Q. To your advantage; what do you mean by "to your advantage"?

A. To our advantage in that we provide a more economical layout of our equipment based upon——

Q. You mean economical to the company?

A. To the Ohio Bell Company, yes, sir.

Q. But there was nothing in the Circular that solved any problems for you other than you had had to deal with and had solved before?

A. That is quite a big problem, to engineer toll equipment for territory the size of the Ohio Bell Company, and if we can find any method that will make that engineering more economical it certainly solves quite a problem, Mr. Dotson.

There are other new sections in 1200 in addition to the toll section. We have a section on desk equipment, central office desk equipment, such as chief operators' desks, etc., that was not covered prior to that time. The local section [fol. 9603] is more comprehensive than in the circular previously furnished.

Q. Well, now, what you speak of at the present time refers only to certain office equipment, that there was simply a change that came along at that time that has and will continue to come along from time to time as office equipment requirements are improved upon and brought forth?

A. That, for one thing, and 1200 was also based upon studies that had been made by the A. T. & T. Company between the time 644 was issued and 1200 was issued, and I presume they will continue to make studies and eventually 1200 will be improved upon.

Mr. Dotson: I expect to have further inquiry to make of Mr. Anthony before he leaves the witness-stand, but I am not

prepared to continue with that now and I will step aside for Mr. McConnaughey to conduct whatever cross-examination he has.

Cross-examination.

By Mr. McConnaughey:

Q. Mr. Anthony, at page 986 of the record you were detailing your experience in the telephone business, and you stated that in 1913 you entered the telephone business as student engineer with the Central Group of Bell Companies, consisting of The Chicago Telephone Company, The Michigan Telephone Company and The Cleveland Telephone Company and the three divisions of the former Central [fol. 9604] Union Telephone Company. Now what was your employment for those companies? What did you do for them?

A. I reported to the assistant to the traffic engineer of the Central Group of Bell Telephone Companies and was engaged in various kinds of traffic engineering as an assistant. Do you want me to outline my duties in detail?

Q. Yes, what you did, particularly how you worked for these different companies?

A. Well, when I first started with the Central Group, as I said, I was a student engineer and was in training for considerable time, visited various central offices in Chicago—local offices—and assisted the engineers in that work, and in connection with the preparation of building studies and in connection with exchange fundamental plans. Later on I worked on traffic orders for local equipment.

Q. Now what was the form of organization? How was the department in which you worked related to these different companies?

A. The Central Group, the department I was in in the Central Group was headed by a chief engineer; he was chief engineer for the five companies comprising the Central Group. He had in his organization the traffic engineer, plant engineer and various other engineers.

Q. Were they developing uniform practices for all of these different companies?

A. No, I do not recall that they were developing practices. They may have at times—most every company I expect does at times—developed some sort of a practice but they were engaged in engineering work.

[fol. 9605] Q. Now the organization was such that the one department was doing this engineering work for all of these different companies under one organization; is that correct?

A. Yes, the work that they did was for the various companies in the Group.

Q. How were you paid? By whom? Where did your pay come from?

A. I have forgotten now; I don't know that. The chief clerk to the chief engineer handed me my check; I don't know where she got it.

Q. Whose check was it? What company paid you?

A. I do not recall. I do not recall that.

Q. What were the three divisions of the Central Union Telephone Company that were in that Central Group?

A. The Illinois Division, the Ohio Division and the Indiana Division.

Q. In 1917 you went back to Chicago after having seen service at Indianapolis as the traffic engineer of the Indianapolis Division, and you stated that at that time you went to work for the Central Union, which included, in addition to the Indianapolis Division, the Ohio Division and Illinois Division and the down state Indiana Division; this makes four divisions of the Central Union?

A. Yes; when I mentioned Central Group there were three divisions, Ohio, Illinois and one in Indiana. However, shortly after the point when the receivers of the Central Union Company were appointed, the Indiana territory was divided into two divisions—Indianapolis as one division and the balance of the State of Indiana, which was operated [fol. 9606] by the Central Union Company, as the other division.

Q. Was there a separate traffic organization in each one of those divisions?

A. Well, each division had a traffic superintendent. As I recall it, the organization that was in effect when there was one division in the State was divided between the two; there may have been some changes in title; I do not recall.

Q. Then in 1920 you were appointed traffic engineer of the companies that had composed the Central Union, that is, the Indiana Bell, the Ohio Bell and the Illinois Bell; they had become separate companies, had they not?

A. The Indiana Company I think had just been organized and was known as the Indiana Bell Telephone Company.

The Iillinois territory I think was still known as the Central Union. I do not recall all of the dates but my recollection is that the Indiana Company was organized first and the Illinois and Ohio Companies were later organized.

Q. You continued in that employment until you became the general traffic engineer of the Ohio Bell?

A. That is right.

Q. When you were the general traffic engineer of these three companies you were occupying the same position with reference to those three companies that you now occupy in the organization of the Ohio Bell? You at least had the same title?

A. Same title. Practically the only difference, the main difference, was that some of the engineering was then done in the field. Put it this way, more often the engineering was then done in the field offices than is now.

[fol. 9607] Q. Well, now, who appointed you to this position?

A. The position I now hold?

Q. No, the position of general traffic engineer for these three companies?

A. Mr. Kositzky.

Q. And he was the chief engineer of the three companies?

A. That is right.

Q. You worked for each of these three companies simultaneously, is that correct? That is, there was one engineering organization that covered the work of these three companies?

A. I worked of course for the chief engineer and we did work for the three companies.

Q. Did each of the three companies have its own engineering force under Mr. Kositzky?

A. Well, each company had some engineers located in the division office.

Q. And then they reported to this general engineering organization at Chicago of which Mr. Kositzky was the head?

A. No, I don't think so. I think they reported to the general manager of the company.

Q. Then what was the function of this engineering organization of which you were a part that covered the three companies; to whom did it report?

A. To whom did Mr. Kositzky report?

Q. Let us put it that way?

A. Why, I presume he reported to the president of the company; I don't know about that.

Q. Which company; there were three companies that he was working for?

A. I think Mr. Bloom was president of the companies at [fol. 9608] that time.

Q. Of all three companies?

A. Yes, sir.

Q. Then did he conduct three separate organizations for these three companies?

A. Why, there was an organization in each company. I don't know what you mean by separate. It is very much like our own case today; we have an organization at each division point necessarily.

Q. What I am getting at is this, there were three separate companies. Now you were the general traffic engineer of all of them; is that correct?

A. That is right.

Q. Now was there a traffic engineering department in each company?

A. Each company had one or more traffic engineers, that is right.

Q. Who reported to the president of each separate company?

A. Well, I think they reported—the traffic engineers reported to the traffic superintendent of each company.

Q. Just what was your personal relation to the Ohio Bell Company during this period?

A. We did much of the fundamental engineering for the three companies, and at that time we had considerable work under way and we did the engineering for most of the new projects. Also Mr. Kositzky reviewed the work done by the various engineering organizations in the field.

Q. Now from whom did you receive your pay in that position?

A. I received my pay from the chief clerk to the chief engineer.

[fol. 9609] Q. Which company paid you?

A. I do not recall how the pay check was marked. I don't know that I ever noticed.

Q. You don't know which account, which bank account, paid you?

A. No, I do not. It was paid by the treasurer.

Q. The treasurer of what company?

A. The treasurer reporting to the president of the company, who, I think, was Mr. McNaughton. I understand the checks came from his department.

Q. Was that the treasurer of the Ohio Bell Company?

A. I think he was the treasurer of all the companies.

Q. There was one treasurer of all three companies?

A. That were under Mr. Bloom at that time.

Q. While you were working for three companies you received only one check for your pay?

A. Yes, sir.

Q. There was some sort of a common fund out of which those expenses were paid?

A. I don't know how the checks were drawn; I don't know where they got the money.

Q. So far as you were concerned, you only got one check for each month's pay, or whenever your pay came?

A. Yes, that is right.

Mr. Burr: I don't know whether it will assist counsel any, and I won't make the statement if they object. It may go out of the record if counsel does not want it to stay there. But what happened at about the time that Mr. Mc- [fol. 9610] Connaughey is interrogating the witness is this:

The Central Union receivership, which was the receivership affecting the property of the Central Union Company in Ohio, Indiana and Illinois, terminated in June, 1919, and it was then determined to divide up the Central Union property according to the three states, and the work of dividing it up was commenced, and during that time the Central Union organization was maintained by States until the three separate organizations were formed. Then for a short time Mr. Bloom, who has been mentioned here, acted as president of all three companies, but it is my recollection that his presidency of all three companies did not last a year. That is my recollection of it. I do not think it could have, because the receivership ended in 1919, and in December, 1920, the Central Union property in Ohio was sold.

That is a matter of record here before the Commission. And then it was that Mr. Bloom became president of the Central Union in Ohio. In Indiana about that same time the same thing was done and Mr. Bloom became president of the company. And in Illinois the same thing. Then the consolidation between the Ohio Bell and the Ohio State

Companies came September 17th, 1921, and my recollection is that within two or three months after that Mr. Reed became president of the Ohio Bell Company, so that Mr. Bloom's presidency of the Ohio Bell Company only lasted about a year, if it lasted that long.

Mr. McConnaughey: Aren't you wrong about that date of the organization of the Ohio Company when you say [fol. 9611] it was September of '21? That was the date of the consolidation with the Ohio State?

Mr. Burr: I said the Central Union sold its property in December of 1920.

Mr. McConnaughey: What was it that happened in September?

Mr. Burr: The consolidation between the Ohio Bell and the Ohio State Companies.

Q. Now, in the interval between the organization of the Ohio Bell Company, that is, the old Ohio Bell Company, and the organization of the consolidated Ohio Bell Company, which was in September, I understand that you were still under those three state organizations; is that correct?

A. My recollection is during that entire period. As I recall it the Indiana Company built up its organization first; that is, as Mr. Burr said, there was a transition period during which the new companies were being organized and during that time men were transferred from the Chicago office to the various divisions. Some of the men were transferred to Indiana, some to Ohio and some to Illinois.

Q. Then during this period which you call the transition period, as Mr. Burr has suggested, you were doing traffic work in the traffic department in any one of these three states, wherever it needed to be done?

A. That is certain work, yes.

Q. Now a little further as to the present organization in which you are employed. Mr. Carroll is your immediate superior?

A. That is correct.

[fol. 9612] Q. To whom does he report?

A. He reports to Mr. Ide. He is general manager of the company.

Q. What relation does Mr. Kositzky have to your organization?

A. Mr. Kositzky is chief engineer of the company and reports also to Mr. Ide, general manager.

Q. You are not in any sense of the word a subordinate of Mr. Kositzky?

A. No, I am in a separate department.

Q. You are in a separate department altogether?

A. Yes, sir.

Q. Mr. Kositzky's engineering function applies to plant and physical properties more particularly, does it?

A. Yes.

Q. Not including traffic or commercial?

A. No, traffic and commercial engineering are separate from the engineering done in Mr. Kositzky's department.

Q. Mr. Ide, who is the general manager, reports to the president, I presume?

A. Yes, sir.

Q. You said on page 988 of the record that of the engineering practices and traffic operating methods in use in the territory of The Ohio Bell Telephone Company over 90 per cent have been developed by the General Staff of The American Telegraph & Telephone Company. Who developed the remaining less than 10 per cent?

A. I think in that statement I limited myself to the methods in use in my unit, although I presume the same thing is true in the other units. The A. T. & T. Company developed practically all the practices we are using except that they have not covered in any great detail practices [fol. 9613] regarding the equipping of operators' quarters, such as cafeterias and rest rooms. Outside of those two items practically every practice we are using in our engineering was furnished by the A. T. & T. Company.

Q. Those are the only exceptions you would care to make in that department?

A. Yes. There may be some detail practices—probably are—minor practices, that we have developed ourselves, but broadly speaking the practices we are using were developed by the A. T. & T. Company.

Q. You say there probably are some that you developed yourselves; what do you have in mind when you say that?

A. Oh, I have in mind forms. We may develop a form to take care of some special routine we have in connection with the collection of data, and during the consolidation we had occasion to develop forms for special data required for consolidation purposes.

Q. Well, for instance, give us some specific detail of that kind?

A. Well, I have in mind a form we prepared in connection with a trunking study on a merged basis. We afterwards called the A. T. & T. in to help us on that particular problem because they had had experience at other points that had been consolidated, such as Indianapolis and Minneapolis and some Texas points, as I recall it.

Q. So that you did not actually develop that yourselves then? You went to the A. T. & T. officers in that instance?

A. We developed the form; we called them in and con- [fol. 9614] sulted with them in order to have the benefit of their experience or studies that had been made.

Q. After you had consulted with them did you change the form you had developed or did you use the one you had developed?

A. We did not call on them in connection with the design of the form. We called on them in connection with the data to be used. That is, we consulted with them in regard to calling rates that might be expected on a merged basis, in connection with trunking factors that might be expected on a merged basis.

Q. As I understand it then, it was a situation in which you found same data that you thought would be necessary to consider which you gathered and took it to them to tell you what to do with it; is that correct?

A. No. We did not take it to them. In this case I called Mr. F. S. James and asked him if he could run out to Cleveland and review the problem with us and asked him if he would bring along any data which he had in connection with other mergers which he thought might be of assistance to us.

Q. Tell us what that particular problem was.

A. I just told you, Mr. McConnaughey, it was in connection with the selection of calling rates on a merged basis. For instance——

Q. Give us a particular instance and the facts with reference to it. That will be easier, won't it?

A. You mean an exchange?

Q. Yes.

A. Yes. One exchange was Toledo, where the Ohio Bell had a certain number of offices, a certain number of sub- [fol. 9615] scribers, and the Ohio State had certain offices

and subscribers. It was our thought that when the Ohio Bell subscribers gained access to the Ohio State subscribers and vice versa there would be an increased calling rate per station; that is, the amount of traffic originated would increase due to a larger calling list.

Q. Because there were more subscribers connected?

A. More subscribers connected, greater calling possibilities. We knew that that had been the experience where exchanges were merged although we did not have any detailed data in the matter. There was also the item of the distribution of traffic. On a non-merged basis all of the traffic originated in the Ohio Bell System was completed in that system. However, on a merged basis the Ohio Bell subscribers would be given access to several Ohio State offices. Naturally part of the traffic originated by Ohio Bell subscribers would be trunked to and completed in Ohio State offices. That meant an altogether different distribution of the traffic between offices, which would effect the amount of inter-office trunks provided, would affect the trunking from the A board and would affect the size of the B board. We called on the A. T. & T. Company——

Q. Now wait a minute. As you said a moment ago, you first gathered some data on forms which you devised yourself?

A. That is right.

Q. What data did you collect before you consulted the A. T. & T.?

A. We collected data on past experience in the Ohio Bell System several years back. I think we went back five years. [fol. 9616] Q. That is data as to the calling rate in those different exchanges?

A. As to the calling rate and as to the distribution of the traffic.

Q. To different exchanges?

A. To different exchanges, and as records were not available for the Ohio State System for the past we had special counts made so as to have as much data as possible available.

Q. Were those counts ordinary peg counts?

A. Yes.

Q. They did not differ from the ordinary peg count that you take from time to time?

A. You mean the basic data?

Q. Yes.

A. Yes, it was normal peg count information.

Q. What was the form that you devised to get that information?

A. Why, the form we designed to collect that information was one which showed the calls originating in each office; it showed the trunking factor; and frequently we had this problem to take care of and this was included in the form; the traffic that we might expect to be trunked from Bell offices to State offices would be less the first day of the consolidation than it would, say, two years after consolidation. We were concerned with those different periods.

Q. Why would that be?

A. For this reason; we will say that at twelve o'clock Saturday night we consolidated the two exchanges. Up to that time the Bell subscriber had never been able to call [fol. 9617] State subscribers. It would not be fair to assume that on Monday morning the Bell subscribers would start a wholesale calling of State subscribers except as a matter of curiosity. It takes up time to build up what might be called a community of interest factor between two different sets of subscribers. We had to make provision for taking care of practically all the pre-merger trunking, yet had to make provision to take care of the distribution of calls on the new basis. As a matter of information what we finally did on that, after getting all this information on forms, and reviewing it with the A. T. & T. Company, was to provide Bell to Bell trunks, the same number that were in service, that we estimated would be in service, the night before the cut, and then provided 60 per cent of the trunks that theoretically were required between the Bell and State offices. Now as our State traffic, trunking between Bell and State offices, trunking between Bell offices, would decrease, we would just juggle our circuits so as not to have any waste equipment at the end of the period.

Q. You estimated 60 per cent and then adjusted it according to the experience as it developed afterwards?

A. That is correct.

Q. You have not yet made clear to me just exactly what the new thing was you developed in that study?

A. The new thing was to provide a form for showing all of this information; showing, for instance, what our maximum Bell to Bell traffic would be and then showing the

[fol. 9618] theoretical traffic between Bell and State offices. Now it might happen that the traffic between two Bell offices as of the day before the merger would be greater than the traffic three years after the merger, or vice versa, depending upon the way in which the stations were to be distributed between Bell and State offices.

Now we had to get all of that information on a form so that we could find out first what our maximum condition was and then what flow of traffic we could expect in order that we could take care of the conditions as they developed after the merger. I will be glad to give you a copy of this form if you would like it. It is a pretty detailed thing and I do not know that I have made it clear to you, but we have copies of the form in my office.

Q. I think that would be interesting, but let me ask you if this is what it was; an estimate based upon the data that you could gather as to what the experience was going to be, a detailed estimate; is that correct?

A. Well, we used our own experience, that is our own past experience, and the experiences that other companies had had for similar situations as furnished us by Mr. James of the A. T. & T., who came out to Cleveland to assist us in the matter.

Q. Then as a matter of fact you did not develop your form until after you had consulted with Mr. James?

A. Yes, we developed the form and had the data on it and then called him up and asked him if he would come out and give us the benefit of his experience at these other points [fol. 9619] in deciding what estimates he would make. We already had the basic data on our form and had blank columns for the future estimates.

Q. But you did not make the estimates until you consulted him?

A. We made the estimates in consultation with him, using information we had. The point there is we would be very foolish to go ahead and make estimates without taking advantage of the experience other companies have had in similar situations.

Q. Yes. You will give us that form later?

A. Yes, sir, I will be glad to.

Q. Do you recall anything else that you developed yourself in your own department?

A. Do you mean in the traffic engineering department?

Q. Yes; you have confined your statement now to that department, as I understand it?

A. Why, another matter I have in mind that we developed, I don't know that it is original particularly, but we developed a curve that would show the relation of the trend of business conditions to the trend of toll traffic that we thought would be of assistance to us in connection with projecting our toll traffic for engineering purposes; and we plot on this form the monthly toll messages and then plot on the same form the general business trend as furnished by the A. T. & T. Company. I think it is the accounting department. That is something which we developed and have been using for two or three years.

Q. And that is something that was not covered in any [fol. 9620] of the circulars that were sent to you?

A. The particular way in which we did it was not, although the A. T. & T. sent out a circular showing the trend of business conditions and a projection into the future——

Q. Of business conditions you mean?

A. Of business conditions, and this pamphlet also showed on a separate sheet the trend of toll traffic for the entire system. But we set the thing up a little differently.

Q. You applied that to the Ohio situation, did you?

A. That is right.

Q. What was necessary?

A. Yes, that is right.

Q. Is there anything else that you can recall?

A. Oh, I don't recall offhand right now of anything else.

Q. Now you refer on page 999 to classes for the training of Associated Company men in toll operating, which, as you stated, made those who took the course toll specialists. Give us the nature of that training?

A. These classes were organized by the General Staff of the A. T. & T. Company and I think the course lasted six weeks. Each day, or almost each day, a different toll expert would visit the class and lecture on the particular subject that he had specialized in. I do not mean to say that six times six, or 36 different men came out. Some of them came out on more than one occasion and others would come out and stay three or four days and lecture on the different subjects that they had specialized in.

That course covered toll operating from the standpoint of the operator; that is, they were given a certain number [fol. 9621] of hours practice at the toll switchboards actually

handling commercial calls under the supervision of an instructor and the man heading the class; they were trained in connection with the adjustment of toll operating forces, in connection with the relation of operating to engineering; that is, they were told first what the investment in toll plant meant and how important it was that the plant provided be used to its maximum efficiency. They were told under what conditions they could expect to get the most out of the toll plant and under what conditions they would waste the plant that had been provided.

They were trained as to the proper manner in dealing with the public in connection with the handling of toll traffic. They were trained as to the different methods by which the management of toll offices could be made most efficient and economical. In fact, it covered toll from the bottom right up to the top and when these men finished they were in a position to go back to the job and do much better work.

I might say that most of the men who were assigned to these classes were experienced men. They were not greenhorns in the telephone business. They were in the telephone business, say, for two years up.

Q. Well, now, you testified on page 991 of the record as to the adjustment that you made of the operating force of the Ohio State at Cleveland whereby, as I understood it, you applied the principles of the A. T. & T. circular to the adjustment of operating forces in such a way as to effect [fol. 9622] a 25 per cent saving in that cost. Was it one particular exchange that you had in mind there?

A. Yes, I had in mind there a particular office in Cleveland, although we readjusted the forces in all of the offices. I had in mind specifically the central office and my recollection is that I said something over 25 per cent.

Q. Now tell us in detail just exactly how you applied the principles of the A. T. & T. circular in that central office at Cleveland to effect the result that you got there?

A. I did not say that I personally did that. I said our operating people did it. I got in on the matter because it brought to light the fact that we had an excess of equipment in that office and that was of particular interest to me in connection with my work. However, I will be very glad to tell you what the operating people did to effect that saving.

Q. Alright, go ahead.

A. The first thing our division traffic superintendent did

was to have some peg counts made and closely supervised so that they would be accurate. Having obtained what he considered a correct peg count showing the total calls for the day and the distribution of the calls by half hour periods and having arrived at the units, that is the traffic units, corresponding with those calls, by means of the application of the proper factors for the trunking which they found when the peg counts were made he determined the operators required during each half hour period of the day, and the number of supervisors required during the same period. [fol. 9623] He then checked these requirements against the people actually on the force and found that the force had not been adjusted to the traffic, and by making the readjustment to conform to the traffic obtained he decreased the force by more than 25 per cent.

I am sure it was more than 25, but I cannot give you the exact figure although I think the information is available.

Q. Well, now, that came to your attention particularly because it released a certain amount of equipment; how much equipment, do you recall?

A. I think I have something on that. There were 78 positions installed in that office at the time and the peg counts indicated that they needed 40.3 positions. In other words, there was a surplus of approximately 38 positions, which we planned on using in connection with the consolidation.

Q. How do you propose to use them?

A. This office will be made part of the Cleveland exchange. We are going to consolidate the Bell and State offices and this equipment will be used to take growth. In fact, today we have some Bell stations working in that office.

Q. That is, you leave the equipment where it is with the expectation you would fill it up by later developments?

A. Yes; fortunately the merger makes it possible to use the equipment but if there had been no merger I don't suppose the equipment would have ever been used.

Q. Unless it was moved out and put in somewhere else?

A. Taken out and relocated.

[fol. 9624] Q. Now you testified to a number of instances where you had had different men from the General Staff come out here about various problems. I want to ask you about one or two of those instances. You mentioned Mr. S. H. Brown who came out here in connection with the

fundamental plan you were making of your toll plant, getting his assistance in the solution of certain problems that arose in that connection. What was the problem you wanted to consult him about?

A. It was quite a difficult problem. First, we wanted to get his advice as to the organization required for a fundamental plan of the magnitude we were to make.

Q. What was that fundamental plan? What did it cover?

A. That fundamental plan will cover the State of Ohio, excluding Cincinnati, and it may develop that the Cincinnati Company will work with us in connection with the traffic over the boundary line. It will cover practically the entire State of Ohio.

Q. What particular thing was it you wanted to consult Mr. Brown about in that connection?

A. As I said before we wanted to get his advice as to the size of the organization required for this work.

Q. That is for the making of the plan?

A. That is right.

Q. Yes.

A. As to how large a section we should study initially; that is, making a plan for the entire study at one time would be a very unwieldy job; I do not think we could do it: so we wanted to divide the study into three sections and we wanted to get his advice as to the size of those sections. [fol. 9625] We wanted his advice as to the method of determining which of the exchanges should be toll centers in the ultimate, just how we could go about to determine where we should center the smaller offices.

Q. What do you mean by a toll center?

A. I mean an exchange where toll traffic is handled. It is not advisable to handle toll from every exchange in the State. Take a one position board; that may not always be covered—say an agency office, that may not always be covered; we cannot afford to terminate a toll circuit in an office of that kind because they are not administered efficiently; an operator at a distant point may ring in and not get an answer for a minute or two or three minutes. That is a waste of toll circuits. Then again it is impractical to let operators in the real small offices work out on the toll lines; that is, go all over the country, as the originating operator must do, and it is not always economical to buy

toll equipment for these small offices. It is rather costly and they may not be used efficiently.

Q. Then you might by having these tributary offices call into a toll center make the connection in that way?

A. Yes.

Q. Alright; what else did you consult Mr. Brown about?

A. That was about what we covered while I was in conference with him. Now, as I recall it, I left Cleveland and came down here to a hearing and I think I testified at the time that Mr. Brown was going to continue in Cleveland.

Q. Yes, that is true.

[fol. 9626] A. In connection with that matter upon returning to Chicago——

Q. To Cleveland you mean?

A. To Cleveland, that is right. On returning to Cleveland my toll line engineer reported the balance of the conference to me and they went into detail as to the methods to be used. They reviewed the A. T. & T. circular which covers toll fundamental plan. I do not recall the number of it. They reviewed the various forms required, discussed the amount of past data that should be collected in order to project future requirements. In fact, in that conference they covered practically all angles of toll fundamental plan more or less in a general way.

Q. Now were these things that you consulted him about matters that were not covered by the circular?

A. Some of them, and the circular was discussed with him in detail, so that we were certain to have a clear understanding of it. And he reviewed the experiences that other companies have had in connection with direct toll fundamental plan.

Q. The making of the toll fundamental plan for the state is rather an unusual job, is it not? It is not an everyday matter?

A. Oh, you would not make them every day, no.

Q. Nor very frequently, not every year nor every five years?

A. Well, I don't know how often it would be necessary to make a toll fundamental plan; I think it would depend somewhat on the developments in the territory after your fundamental plan had been made.

Q. Now Mr. James and Mr. Darrah and Mr. Rappleigh

[fol. 9627] came to Cleveland at your request to discuss and assist in connection with a toll tandem board?

A. Yes.

Q. What is a toll tandem board?

A. A toll tandem board is a centralized board that is used for tandem trunking calls from one exchange to another. The board I have in mind is the one which we have provided at Cleveland and is used in connection with an AB toll method which we are introducing. We have trunks from each Cleveland central office to this tandem board.

Q. What do you mean by tandem trunking?

A. I have in mind this, that ordinarily we have only two offices in the connection, the originating office and the terminating office; however, it is not always economical to provide direct trunks between each pair of offices; therefore we have an intermediate point where the trunking is done. This intermediate point in this case is the tandem board and we have trunks from each office to the tandem board; that is, in-coming to the tandem board; and then out-going we have toll circuits to several of the outlying offices.

Q. Then the message would go through two boards——

A. No, the call would be originated by a subscriber, say, in the main office. The A operator who answers that call upon being given the order goes over a trunk to this tandem operator and gives her the called point. The tandem operator then makes connection to a toll circuit to the called point; say it is Bedford. The Bedford operator answers and completes the call to the proper station. The Cleveland main [fol. 9628] operator times and supervises the call.

Q. Now you had these three men out here in connection with the engineering of that board; is that correct?

A. That is right.

Q. That is something that was not covered in any of the circulars?

A. It is referred to in circulars but we had a problem that we wanted to meet quickly, and I felt as if we could expedite it by having these men come out and go over it with us in detail, because we had never engineered a tandem board. And Mr. Rappleigh stayed for several days after Mr. James and Mr. Darrah left and actually instructed us and assisted us.

Q. You testified as to receiving the assistance of Mr.

Mogarith in the checking of machine switching service observations. What sort of an operation was that? Why was it necessary to secure his assistance on that?

A. Well, the taking of observations on machine switching equipment is comparatively new. I never heard of observations being taken of machine switching equipment until the A. T. & T. Company developed an equipment and a method of so doing. We asked Mr. Mogarith to come out. He is a specialist, by the way, on the general subject and has trained switching observers all over the country. We asked him to come out and assist us in the training of machine switching observers at several points in Ohio, such as Youngstown, Massillon, Alliance and Columbus.

Q. Well, now, on page 1006 you testified with reference to a personal conference with Mr. Van Hagan in connection [fol. 9629] with cut-over plan at Youngstown. What was your particular problem there?

A. We had several problems there. One was the providing of special equipment for use immediately following the consolidation. That is, we cut into machine switching equipment in the neighborhood of 16,000 manual stations.

Q. That is, you connected manual with automatic stations in that way?

A. No, we cut these 16,000 stations from a manual board into machine switching offices, provided dials at all of the subscribers' telephones and naturally it takes some little time for a subscriber to get familiar with the dial, and it was our understanding that cut-overs of that kind resulted in a large amount of assistance being required of the subscribers, and we conferred with Mr. Hagan with regard to his experience in New York, Boston, Philadelphia, Seattle and Omaha, and I don't know—any number of places—his experience as to the requirements during the first week or two after the merger. He gave us considerable information along that line which assisted us in preparing a traffic order for the special equipment. He also reviewed with us the assignment of lines and stations in the mechanical equipment. It is quite necessary in mechanical operation that the subscribers' lines be pretty evenly distributed between the various units of equipment so that all the trunks will not be found busy oftener than necessary. Mr. Van Hagan, in connection with the machine switching

cut-overs and matters of that kind, assisted us in our problem.

[fol. 9630] Q. What is the method pursued in getting the assistance of these General Staff experts on these various problems? Who is it that makes the request that they come out and give you this assistance?

A. In the two cases referred to—that is, Mr. James, Darrah and Rappleigh came out on the tandem board and Mr. VanHagan came out on the machine switching, and also in the case of Mr. Mogarith, who came out on the machine switching observing, I personally requested their services.

Q. That is, you personally wrote to the A. T. & T. offices in New York?

A. Either that, or called on the telephone. I do not recall. In other cases Mr. Carroll may request a man to come out and help some one in the traffic department, either myself or one of his other men.

Q. Now it is not necessary for you, as a subordinate of Mr. Carroll's, to have Mr. Carroll make this request or secure his approval of it before you make it or anything of that kind? You go directly to the A. T. & T. organization?

A. Unless I think it is something that he would like to get in on personally, I make the arrangements myself.

Q. You use your own judgment about that?

A. Pretty much.

And thereupon the further hearing of this matter was adjourned to Tuesday Morning, May 27th, 1924, at 10:00 o'clock.

[fol. 9631] Tuesday Morning Session

May 27th, 1924.

And thereupon the further hearing of this matter was resumed pursuant to adjournment.

Present:

Same counsel as at previous session, and T. H. Miller and J. E. Kinnison, on Behalf of the City of Canton.
Carl F. Shuler, on Behalf of the City of Cleveland.

And also W. T. ANTHONY, resuming the stand for further cross-examination, continued his testimony as follows:

Cross-examined by Mr. McConnaughey:

(Record read.)

Q. I think you also testified, Mr. Anthony, that there were numerous occasions when the division traffic men have gone to the General Staff of the A. T. & T. for information of various kinds; is that correct?

A. Why, I do not recall just how I stated that, but it is true that the A. T. & T. General Staff people go into the field and assist the division traffic superintendents in solving their problems.

[fol. 9632] Q. And that without any consultation with you as the head of the traffic department or with Mr. Carroll as your superior?

A. Well, sometimes Mr. Carroll will suggest that an A. T. & T. man go to a certain exchange in Ohio and assist the local people. At other times Mr. Michael——

Q. Who is he?

A. He is the general supervisor of traffic, or Mr. Eckley, who is the general supervisor of toll traffic, will request A. T. & T. people to visit a certain exchange for the purpose of assisting the local people. Then again the division traffic superintendents may call on New York, either through the general office or direct, and request assistance on certain of their problems.

Q. And in that case you would know nothing about it perhaps?

A. No, I ordinarily do not get in on those visits unless they affect engineering. Sometimes I may sit in their conference if they do not affect engineering. But any requests for assistance in connection with operating problems are not made through me.

Q. Don't the division traffic men have to do with engineering problems?

A. Indirectly. Practically all of the traffic engineering is done in Cleveland. As I stated yesterday, we handle in Cleveland the engineering for all common battery offices. The field people, that is the division traffic superintendents, handle the traffic engineering for the magneto exchanges.

Q. Those are the smaller exchanges?

A. Yes, sir, the one, two and three position boards.

[fol. 9633] Q. Now are there any instances, Mr. Anthony, when people from the General Staff come to Ohio without

being requested by the Ohio organization for the purpose of talking with you about local problems?

A. Yes, quite often they do. Last week—week before last Mr. James called me and told me he would like to come out to Cleveland and discuss with us a little further the toll tandem problem I mentioned yesterday. That is a rather complicated job and after his visit out here two or more months ago in studying the matter in New York further points developed which they thought it well to discuss with us in conference, and he came to Cleveland last week. I was not there. I was at this hearing and I did not confer with him but my people I think spent two days with him.

Q. Do you recall any other instanees where they have come out without your invitation?

A. Yes, I know of a case where Mr. Ramon, who is an assistant to Mr. Allen on toll problems, came out to Cleveland some time ago to discuss with Mr. Eckley some toll problems at Akron and Canton. I know he visited both of those exchanges and there may be others; I do not recall.

Q. Just what was the nature of the problems that he came out to discuss?

A. I do not know, Mr. McConnaughey. That is out of my line; but I happened to be in Mr. Eckley's office when Mr. Ramon came in, and from their conversation I understood Mr. Ramon had gotten in touch with Mr. Eckley and suggested that he would like to come out and confer with him on some problems that they had down there, but I did not [fol. 9634] enter into the conference at all. Mr. Mogarith whom I have mentioned in my testimony, came out to Cleveland on his own initiative to assist us in our machine switching service observing. We had previously requested Mr. Mogarith to come out and he has made several visits to Ohio, and the last visit he made on his own initiative. He got in touch with us and suggested that he would like to come back and follow up the work which he did on his previous visit.

On this machine switching service observing, as I said before, it is a new problem with us. In fact it is a new problem in the telephone business and there is considerable involved in it. It provides a means for us to know what kind of service we are giving our subscribers in our machine switching offices. We have installed in several of our machine switching offices machine switching service observing

equipment which was designed by the A. T. &. T. Company and have assigned to each of those offices an observer who sits at this board and observes the progress of the calls originated. She gets in on the call when the subscriber starts to dial. On a tape associated with that board the number that the subscriber dials is recorded. She follows the connection through; if he encounters any machine trouble in going through the switches the observer is aware of this. Record is made of the difficulty he encountered. Later on that information is used by our plant people in checking up the equipment. It provides a means for determining where, in the equipment, the subscribers are getting into trouble. It provides a means for determining what per cent [fol. 9635] of the calls are not completed due to subscribers' lines being busy, due to the called station not answering, due to all trunks in the various paths being busy.

It gives us a general picture of the service. Those observations are summarized at the end of each week and then again for the entire month. We furnish a copy of the result to our plant department. They analyze the calls that were not completed. Such an analysis provides for information as to where the plant may not be functioning properly. The traffic department analyzes the results of the observations in order to determine whether or not the subscribers have been properly educated to dial correctly, whether they are using the latest issue of the directory. We often find that a subscriber does not use the new issue of the directory but calls from memory, and numbers are changed occasionally, of course; and he may be getting poor service because of the fact that he is not consulting his latest directory but is calling from memory.

We get that information from our observation which enables us to get in touch with subscribers, to make sure that he has not lost the last directory and to make him know that to get good service he must use the latest directory.

It provides the traffic department with means of knowing whether or not the load has been properly distributed between the various units in the office. I mentioned yesterday Mr. VanHagan coming out here to help us on the assignment routine in connection with transferring subscrib- [fol. 9636] ers from a manual office to the new machine switching offices at Youngstown. Now that works right

into the service observing. The assignment of lines in connection with the Youngstown merger was very complicated and that is why Mr. VanHagan made several trips out here.

In the first place, taking the Bell office, the in-coming equipment is divided into 140 units, each unit having 100 terminals. Now on an average there are eight connectors per 100 subscribers. I mean by a connector the final switching in the train that completes the call in the economical office. In dividing that equipment up between such small units as say eight trunks in a group unless we are very careful we are going to distribute our lines and stations so that some boards are overloaded and some are underloaded.

Now overloaded boards mean poor service to the subscribers for the reason that they get as far as the connector board, all trunks are busy and no further service. In Youngstown we have several classes of service. We have P. B. X. trunks, measured service lines, flat rate lines, consisting of individual business, individual residence, two-party, four-party. Now each one of those classes has a different average calling rate. In setting up the assignments for Youngstown we compared with Mr. VanHagan as regards the method used at other points in distributing these lines over the 140 boards so as to use the equipment to the greatest efficiency and yet not making our assignments so that we would encounter more than a normal number of busy trunks resulting in a subscriber not getting through.

[fol. 9637] That meant we had to consider the traffic originated by each of these classes of service, more than six classes.

It was also necessary for us to take into consideration the different types of business lines. For instance, we would not want to put in any one board several grocers' lines because as a rule the traffic to a grocery, the maximum traffic to grocery stores, comes at about the same hour of the day. It would be better to mix with the grocery lines other classes of subscribers that would have their maximum traffic during other hours of the day.

It might be interesting to note that the results of this assignment work are very good. We have continuous records from Youngstown since the consolidation and we had only two numbers out of 140 that were overloaded after

the first two days. The first two days we had a very heavy load at Youngstown, due to the large amount of curiosity traffic; probably we had a 40 per cent curiosity load. Since that died down we found that there were only two boards that were overloaded to the extent that required any adjustments in the terminating of the lines.

Q. These are the things that Mr. VanHagan assisted you in?

A. That is one thing Mr. VanHagan assisted us in. He also assisted us in determining how much special equipment we would require. For instance, at Youngstown we have a special code for a subscriber to use if he is unable to dial. That is what we call the zero call, or Operator. If he does not know how to dial he pulls the dial around to the hole [fol. 9638] that says "Operator"; we have a number of operators to receive those calls. They determine what trouble the subscriber is having, and if he is unable to complete the call himself by means of equipment which he has she completes the call for him, and then if we find that certain subscribers are calling this operator regularly we send a representative to visit that subscriber and explain in more detail the operation of the mechanical equipment.

Mr. VanHagan also assisted us in laying out our intercepting equipment. By intercepting equipment I mean equipment that is used to take care of lines which have been disconnected or on which the number has been changed.

He also assisted us in the issuing of instructions necessary for the special operators on duty immediately following the cut-over.

Another problem we had in connection with the cut was to see that we did not cut off any emergency calls that might have been up at 11:45 on Saturday night when we made the cut. That is, usually there are a few emergency calls up; now it would be rather serious for us to cut those subscribers off. When we cut these 16,000 stations from one station to another Mr. VanHagan, through his experience of other cuts of similar nature, was able to tell us the best means of providing a temporary connection to take care of those emergency calls.

There are, oh, a number of other things that he helped us on in connection with that cut over. It was a rather complicated job; in fact, the most complicated job any company [fol. 9639] has ever had, as I understand it.

Q. What do you mean by this curiosity load that you speak of there?

A. By that I mean, Mr. McConnaughey, this. For a number of years the Bell subscribers in Youngstown have had manual telephones. Now when we changed to automatic equipment we provided a dial at each subscriber's station. It was something new and the experience at all automatic cuts has been that the first few days the subscribers originate a large number of calls just to see how the thing works. For instance, the school children find that before going to school, say at eight thirty or a quarter of nine, during our regular maximum period, that they can use the dial telephone. They will call one of their school chums and see if they can get through and hang up and then the other boy will call him back, and usually results in an excess or an abnormal amount of traffic, to the extent of 25 to 40 per cent, and at Youngstown we had a further reason for this abnormal traffic, and that was, in addition to cutting machine switching equipment into the Bell System at the same time we consolidated two systems that previously had not been connected. That meant all Bell subscribers could call State subscribers, and vice versa, and that resulted in a large amount of so-called curiosity traffic.

Q. What were these emergency calls that you made special provision for?

A. Well, for instance, a subscriber might be calling the police department, might be calling the fire department giv- [fol. 9640] ing instructions, might be talking to a doctor, or whatnot.

Q. That applied simply to the calls that happened to be open at that particular time?

A. That happened to be in progress at a quarter of twelve. That is, this cut was planned so that at 11:45 the plant department were to be ready to start cutting the 16,000 lines from manual to automatic. And I think it took eight minutes to make the cut. They cut the 16,000 lines in eight minutes. A large amount of preparatory work had been done to make that possible.

Q. How was that done?

A. Well, that is a plant job. I do not know that I can give you all of the details of it, Mr. McConnaughey. For months prior to the consolidation the plant department had been making their plans. For instance, the traffic department

had made the assignments in the Mechanical office. It was necessary to change every number in the Bell System and we had furnished the plant department with the number of each subscriber we have after he was in the machine switching office.

Now that meant that, for instance, a number that was Main 1234 on a manual basis would be 34567 on a mechanical basis. The plant department had run these more than 16,000 jumpers over weeks before the cut.

Mr. Burr: Jumpers are wires, are they not?

The Witness: Yes, wires between frames. They were all ready to solder it down.

Q. That is, there had to be one of those jumpers for each line?

A. Yes, and they had a schedule so that this employe was [fol. 9641] to take this list, another employe to take this list, another employe to take that list, etc; had the work assigned so that each man had about the same amount of work, and they completed this cut in eight minutes.

Q. What was the cut, just in a word; you cut a wire and soldered another one?

A. That is right; the jumpers were all run; it was a question of soldering down the connection.

Q. How many men did it take to do it?

A. I don't know; they had a big force of men down there. The terminal room was so crowded I did not get into it and I would have bothered them had I gone in. But they had a large number of men.

Q. That is a little aside from the inquiry but our curiosity got the better of us. Now have you stated all of the instances you have in mind where the A. T. & T. men came out to Ohio on their own initiative for the purposes of consolidation?

A. If I had time I expect I could think of dozens of them

Q. It happens very frequently, does it?

A. Oh, yes, they often—if they think that they can help us they do not hesitate to get in touch with us and offer their services. That is, we work together very closely.

Q. Do they sometimes make inquiries to find if there is anything bothering you that they can help you about?

A. Yes, usually if a man comes out on a specific problem—we will say that conference lasts a day, often late in the after- [fol. 9642] noon when we are winding up he will ask if we have anything else that he can be of service on, and many

times that results in his staying over the next day and working on other problems.

Q. Do they sometimes come out here with entirely new things to talk to you about?

A. Yes, sir.

Q. To inform you about, to instruct you about?

A. Yes, sir, they often come out before they complete the development of a project they have in mind to determine to what extent we can use that development and talk it over.

Q. Now you mentioned an instance where Mr. Blackburn visited New York in the matter of equipment problems at Youngstown. Who is Mr. Blackburn?

A. Mr. Blackburn at that time was machine switching traffic engineer.

Q. Why did he go to New York rather than have New York come here, as seems to be the common practice?

A. Well, as I said in my direct testimony, the New York people come out here to visit us oftener than we visit them for the reason that we like to get as many of our people in on these conferences as possible. Now in that particular case Mr. Blackburn went to New York because the problem he had involved not only the traffic engineering but it involved equipment engineering and it involved the operating end of the game. That meant that at least three A. T. & T. men should sit in on that conference. We felt that in that case it would be better for Mr. Blackburn to go to New York on that problem so that he could confer with as many A. T. & T. people as was necessary. However, if we had made the [fol. 9643] request for an equipment engineer, a traffic engineer and an operating man to come to Cleveland our request would have been granted.

Q. Who paid your expense of that visit to New York?

A. To New York?

Q. Yes.

A. I do not know definitely.

Q. What is the practice, do you know?

A. Why I do not know how those funds are maintained. I know that when we make a trip any place we send through a voucher stating the city we visited, and detail our expenses. For instance, my voucher goes to Mr. Carroll, my superior, and I think that it eventually goes to the auditor. Now I am not familiar with the bookkeeping methods.

Q. You don't know whether it is finally passed on to the A. T. & T. expense account or not?

A. No, I could not say, Mr. McConnaughey.

Q. You yourself visited New York in July of 1923 with reference to the unification plans at Columbus and Youngstown?

A. Yes, sir.

Q. Why did you go to New York rather than have them come out here in connection with that problem?

A. Well, that was a very similar situation to the one I just outlined in Mr. Blackburn's case. A unification involves every department. Before we can settle many traffic engineering matters we must confer with the equipment engineers, with the commercial engineers and with the operating people. And the Columbus job involved all of those departments. As I recall it we conferred with Mr. Farman, [fol. 9644] who is local traffic engineer; Mr. Charlesworth, who is plant engineer; Mr. Roberts, who is one of Mr. Charlesworth's assistants; and Mr. Jacobson, who is in the development and research department of the A. T. & T. Company; Mr. Stimson, who is the machine switching traffic engineer of the A. T. & T. Company; Mr. Ferguson, who is an assistant to Mr. Stimson. Oh, I don't know, there were quite a number of people in on that conference, because it involved this big unification plan at Columbus and these people that I mentioned had had experience in connection with other consolidations similar to the Columbus situation.

Q. Does the Columbus situation differ materially from that at Youngstown?

A. Oh, yes. Yes, at Youngstown we had two Bell units, manual units. We had a machine switching system in the State office; we had a comparatively small manual office at Struthers, which is part of the Youngstown exchange area, and a magneto office at Lowellville, which is also part of the Youngstown exchange area.

Now in Columbus we have a much larger city, big multi-office city, involving a large number of manual offices, involving at the present time a large machine switching system. In Columbus we have a large multi-office problem.

In Youngstown, while it was a very complicated job, it is what we would call a small multi-office plant.

Q. It was sufficiently different so that your experience at Youngstown would not enable you, without A. T. & T. assistance, to go through with it?

A. No, sir.

Q. Now you also made a visit to New York in January of

[fol. 9645] 1923 in connection with short haul toll problems at various points and also in connection with the Columbus merger. What do you mean by short haul toll problems?

A. By short haul toll problems I mean the handling of short haul toll traffic. That is, there are several methods of handling toll traffic. There is the single ticket method, which involves handling the toll call in a regular toll office; that is, a subscriber wishing to place a call to a point which is reached via the single ticket method calls Long Distance. The Long Distance recording operator takes the details of his call. That ticket, by means of a special mechanical conveyance or a messenger, is sent to a special position at what we call the outward board connecting to its destination.

For instance, in Columbus we try to handle all of the traffic to Cleveland at one position, or if we have more traffic than can be handled by one operator we will spread it over two, three or four consecutive positions. The same with traffic whose destination is, say, Toledo. That is segregated at one or more special positions. That operator when she is ready to work on the call goes back over the special toll switching trunk and picks up and holds the calling subscriber's line so that when she reaches the called point she will not encounter a busy line at the calling end. That is, we hold the calling subscriber's line for a short period while we are working out over the toll circuit. That, in brief, is the single ticket method.

Now another method is what we call the two number toll [fol. 9646] method. The two number toll method is used on shorter haul traffic than the single ticket method. It involves less operating expense. Under the two number method a subscriber wishing to reach a point that is handling via the two number method gives his call to his local operator. The local operator passes the calling and called numbers to a two number operator. The subscriber remains at his telephone. And I might say here that under the single ticket method the calling subscriber hangs up his receiver after he places his call and is then called back, while under the two number method the calling subscriber remains at his telephone. The two number operator goes back over a switching trunk and makes connection to the calling subscriber's line.

At the toll switching position when the toll switching operator gets an order for this line she will test and find the line is busy because the calling subscriber still has the

receiver off of the hook. Therefore our two number operators in calling a number of this kind, in passing the number, say "without", that instruction meaning that the toll switching operator will not test the line but will plug in right over the busy. The two number operator then takes up a circuit to the distant point and completes the call. That makes for a much faster service than the single ticket method and results in operating economy.

Q. What sort of calls does that apply to?

A. Pardon me?

[fol. 9647] Q. What sort of calls does that apply to?

A. What distance?

Q. Yes.

A. I was just going to explain that, Mr. McConnaughey. The reason that the two number method cannot be extended as a universal proposition is that it is necessary to provide toll circuits on a more liberal basis. That is, if we ask the public to stay at their telephone in placing a telephone call we must provide sufficient circuits so that we complete the call on the first attempt in the majority of cases. Now we could not afford to provide circuits on such a liberal basis where the haul is very long on account of the big investment, so that we limit this method to a distance of around 30 miles. In some cases we will go beyond, if there is a large community interest factor between two places or if we have cable facilities.

Another toll method which is faster and more mechanical, than the two number method where it applies is called the AB toll method. Under the AB toll method a subscriber placing a call to a distant point that is reached via the AB method gives the called number to his local operator. She has appearing directly in front of her circuits to this distant point, or reaches the distant point by going through a toll tandem board which I referred to yesterday.

The A operator writes the ticket and supervises the call and she is the only operator in on the connection at the originating point except the tandem operator, in case we have introduced a tandem board in the connection. It is not necessary for her to order the subscriber's line be-
[fol. 9648] cause he talks right over the connection. That is, there is just the one pair of cords, the answering cord being plugged into his line and the calling cord into the

toll circuit or into a trunk to the tandem board if the tandem method is in effect. As I said, that method is faster and more economical from an operating standpoint than the two number or the single ticket methods. This method is used on traffic—is used where the distance does not exceed about 30 miles and where the local conditions are such that this method can be adopted or proven in over the two number method.

In a single office city this method we can make a very good case for because we can give the A operators access to the toll lines. However, in a multi-office city it is not practical to provide circuits in each office.

Take Columbus, for instance, with six offices, it would not be practicable to give each one of those offices separate toll circuit groups to the outlying points. So that in a multi-office city we are confronted with this problem, shall we introduce the AB method and use a tandem board, or shall we introduce the two number method?

Now we study each case on its merits and reach a decision in that way. As I stated yesterday we have introduced at Cleveland the AB toll method and have a tandem board in operation.

Q. Is that the only place where you have a tandem board?

A. That is the only place at this time. However we are considering a tandem board at Columbus and Toledo and Dayton. We may later consider a tandem board for [fol. 9649] other exchanges.

Q. Well, now, I was asking you about your visit to New York in January of 1923. What was the particular problem that you went there to take up?

A. Well, just a discussion of the details of some of the things I have just mentioned, Mr. McConnaughey. The A. T. & T. people have followed the short haul toll methods very closely. There is a large development of AB toll traffic around New York City. They have a very fine field for it because they have several large cities in New York State, and over in Jersey. In Chicago they have had also for a number of years a good field for the AB toll and for the two number method.

I went to New York to discuss with the A. T. & T. engineers the question of provision of toll circuits; that is, how elaborately we should provide our toll circuits. I

discussed with them the operators' loads for these various methods. They have developed operators' loads for various toll operating methods. We go together with the equipment engineers of New York to discuss the possibilities of multipl-ing toll circuits in a local board. That is quite a problem. Our toll lines as a rule are of the magneto type. In our larger exchanges we have common battery operation and it is not possible to use common battery cord circuits in making the connection to a magneto toll circuit.

However, the A. T. & T. Company, as we understood, had developed a special toll line jack, some sort of relays in this toll line circuit, that would make it possible to connect any ordinary common battery cord circuit on a local [fol. 9650] subscriber's switchboard with a toll line of the magneto type, and we were interested to know what this equipment would cost and where and under what conditions it would prove in. That is why I visited New York instead of having the New York people come out here, because more than one department was involved in the problem.

Q. Now you are planning some improvement in this short haul toll traffic in your territory and you went there for instructions?

A. That is right.

Mr. Laylin: I just wanted to ask Mr. Anthony, in the AB calling and also two number, as to those two, are they used in Columbus on the old Ohio Bell lines at all?

The Witness: On next Monday or a week from Monday—I think it will be this coming Monday—we will introduce in both the Bell and State systems the two number toll method to certain cities outside of Columbus. I think we are to run some newspaper ads this week advising the public that this method will be available and instructing them as to how they should place their calls.

By Mr. McConnaughey:

Q. Where else in Ohio is it in use?

A. We have had a two number method in use in Cleveland for quite a long time. I cannot say just how long, but the two number method was in effect when I came to Ohio in 1921, and as I just stated we are now introducing an improved method, which is the AB method; that

is, improved so far as cost elements are concerned. The two number method is in effect at Canton, Ohio. It is in effect at East Liverpool. The AB method is in effect at [fol. 9651] Youngstown. We made it effective when we consolidated, did all the work at one time—and other points; I cannot recall offhand all of the points. But we are getting the AB or two number method introduced at many other points.

By Mr. Laylin:

Q. Isn't it true that a method analagous to the number two method has been used on the Ohio State lines for short hauls in Columbus for several years?

A. I don't know that it has, Mr. Laylin.

Q. You don't know that?

A. No, sir; I know we are going to introduce it in the State System on either this coming Monday or a week from Monday.

Q. What have they been using here, do you know?

A. They have been using the regular toll method.

Q. Don't you know that you can make a call and get direct through to the local operator at the called point over the Ohio State? For instance, if I were calling Worthington or some outlying county towns here, that I can get right through immediately and get the connection made?

A. I think there has been some toll line dialing in the State system in Ohio where the subscriber dials——

Q. That has been for several years, has it not?

A. There was some of that when we took over the Ohio State property.

Q. But you don't know how long?

A. No, I do not. We have found it advisable to discontinue that method as we merge these various points for the reason that the toll line dialing method in use in the Ohio State system killed the possibility of phantom circuits. For instance, if there were two circuits between [fol. 9652] two cities and toll line dialing was in effect, it is not possible to create the third circuit or what we call the phantom circuit.

Now our chief engineer's office made quite an exhaustive study of that matter and it developed that it was not economical to lose the phantom possibilities on these

circuits because toll line construction is very costly. So that we have discontinued that method as we merged these various points in order to make our toll plant more efficient.

By Mr. McConnaughey:

Q. Then how do you put it back in effect in this new development?

A. Beg pardon?

Q. How do you put it back in effect in this new development?

A. Which new development?

Q. This AB system you put in effect?

A. That is not toll line dialing. I thought Mr. Laylin had in mind where a dial is used to complete a call at a distant point.

Mr. Burr: That was it, wasn't it?

Mr. Laylin: No; this is what I think is analagous to your two number system; I am not very clear on this—whereby you call long distance and are immediately connected with the operator at the distant point. I think that is the practice, if I am not mistaken, that has been in effect here on the Ohio State now.

The Witness: If such a practice is in effect I am not familiar with it. I hardly think it is. Mr. Allen did refer in his testimony to such a method which was in use from [fol. 9653] the Neil House but I think he said that it had been discontinued and I am not familiar with any such method as that.

By Mr. McConnaughey:

Q. Well, now, this single ticket method, how generally is that used in Ohio?

A. Oh, practically all of the traffic that cannot be handled on an AB or two number method is handled via the single ticket method.

Q. That is not peculiarly a short haul proposition?

A. No, that is a long haul.

Q. Yes.

A. For instance, calls from Columbus to San Francisco are handled via the single ticket method unless they are special calls that do not lend themselves to that operation, such as messenger calls.

Q. Now the instances you have named of consultations between your organization and the A. T. & T. General Staff are typical of the method in which these things are carried out in the ordinary course of business, are they?

A. That is right.

Q. Yes. Now going back to the single ticket method. You used in your calculation of savings due to the adoption of that method a figure of 5,519,900 calls. What proportion of the total toll calls is that?

A. You have in mind what proportion of the tollboard calls, not the AB or two number?

Q. I am not interested particularly in what it is a proportion of, but I want to know what that represents of your traffic?

A. Well, that represents all of the calls handled by the [fol. 9654] Ohio Bell Company on the single ticket method.

Q. Do you keep a separate record of them as single ticket calls or how do you get at that as the number?

A. We get at that in this way, Mr. McConnaughey. We keep a monthly record of the tollboard calls handled and then we have supplementary records by classes. For instance, as I just said, message calls are not handled by the single ticket methods. Collect calls to pay stations are not handled by the single ticket method. We have supplementary records of that traffic and this figure which I have quoted represents only traffic that was handled via the single ticket method.

Q. It would not include the AB calls?

A. Oh, no, it would not include the AB or two number.

Q. What is the total number of calls represented in that period for which you took the 5,519,000—the toll calls?

A. I haven't got that. All I have is the single ticket calls.

Q. Now have you the calculation that you made of the savings on that method before you?

A. Yes, sir.

Q. You showed in your analysis of savings a saving per call in operating and switchboard expense of 9.52 cents and in toll circuit expense of .81 cents?

A. That is right.

Q. What is the total cost? That is an average, as I understand it.

A. Well, that represents the average saving per call handled by the single ticket method as against the cost

which would have obtained had we handled the traffic on the two ticket method.

[fol. 9655] Q. How did you determine that that was the saving?

A. Well, I determined it in this way, Mr. McConnaughey. We know what the operating labor is on a single ticket call, on the average single ticket call. We know what the operating labor is on two ticket traffic. Now we took this actual traffic and by taking into consideration the operating saving under the single ticket method we arrived at these figures you have quoted.

Q. $9.52 and 81 cents?

A. No, 9.52 cents and .81 cents.

Q. Now did you determine first the cost of the two ticket call?

A. No, I determined what the saving in operating labor was under the single ticket method as against the two ticket method.

Q. Well, what was the saving in operating labor? Is that determined by the difference in time that it takes to make the call?

A. Yes—not the time it takes to get the subscribers talking but the difference in the amount of actual labor that an operator spends on the two kinds of calls.

Q. Isn't that determined on the time basis?

A. It is determined on the basis of work units which we have set up for these various classes of service as explained by Mr. Allen. In other words the coefficients, the traffic coefficients.

Q. What are the elements that enter into that calculation? How many of these units were used under the old system and how many under the new?

A. I think in my previous testimony I stated that for [fol. 9656] the items of work required in completing a call where the two ticket method effected a saving, we saved 16.11 units per call. There is no saving on the recording operator's labor on a two ticket call—on a single ticket call over a two ticket call. She does the same amount of work.

Q. That is, the recording operator is the operator at the sending station who makes the original record, the first record?

A. That is right.

Q. She makes that record now under the single ticket method?

A. Just as she did under the two ticket method. However, the single ticket method results in a saving in the outward operator's work for the reason that under the single ticket method it is not necessary for her to transmit to an operator at the distant point the details of the call. Under the two ticket method the outward operator would ring the distant office. The inward operator would answer that call. The outward operator would ask for the ticket operator. The inward operator would transfer that call to a ticket operator by means of pressing a button associated with the toll line or by going over a trunk to the proper position, and asking the ticket operator to pick up a call on circuit number so-and-so. Then the outward operator would transmit to this ticket operator at the distant point all the details of the call.

Q. That is, who was calling and who they wanted?

A. Yes, sir, that is right, and any other instructions that might be given. That is, the subscriber might say he would [fol. 9657] talk to Mr. Smith or Mrs. Smith or some one else.

Q. Yes.

A. Now all that time the outward operator is engaged; she waits on the ticket operator to take the details of the call and then they check to make sure that their records are the same. Under the single ticket method the outward operator rings the distant point; the inward operator answers; the outward operator gives her the number of the called station; the inward operator rings, the subscriber answers and the outward operator has the connection completed.

Now that single ticket method results in a saving in the outward operator's time. At the distant point under the two ticket method there are two operators in on the connection, first the inward operator who answers the signal as it comes in from the originating office and then the ticket operator who answers the signal as it is transferred by the inward operator, and she takes the details of the tickets and checks back to the outward operator and then endeavors to complete the call to the proper station.

Under the single ticket method the only work involved is for the inward operator to receive the number of the called station and make a connection to that station and she is through. So a big saving in operating work at the distant office results with the single ticket method.

Q. Now you get at this $9.52 because that is the cost of 16.11 units of work, is that it?

A. Yes; it should be 9.52 cents. I think you said $9.52.

Q. 9.52 cents?

A. Yes, sir.

[fol. 9658] (Previous question read.)

A. That is the cost of 16.11 units of work plus the charges on the excess switchboard use.

Q. That is in the other item of .81 cents, isn't it?

A. No, .81 cents represents a saving in the toll circuit; that is, the single ticket method results in less waste circuit time than the two ticket method. If you recall, I detailed the passing of this call to the distant point. All that time the circuit is held, whereas by the single ticket method that time is saved. Now the .81 cents represents the saving in operating expense and equipment.

Q. Central office equipment?

A. That is right.

Q. Well, now, how did you get at the saving in central office equipment? How did you figure that?

A. That is figured in this way; I first estimated the switchboard equipment required to handle a unit.

Q. At what?

A. Pardon me?

Q. At what figure?

A. Well, this is the amount, the fraction of a position required to handle a unit, and then applied the annual charges per switchboard position to the units or to the fraction of a position required and that gave .1447 cents as the switchboard expense per unit.

Q. That is you took the cost of the switchboard; what did you do? Did you take the total cost of toll switchboard over the state and determine its value and apply annual charges to take care of maintenance and depreciation?

A. Practically that, Mr. McConnaughey. I got from our [fol. 9659] chief engineer's office the annual charges per toll switchboard position for the company. That figure I think includes the interest on investment, depreciation, taxes and insurance and any other items that make up that item.

Q. What is that figure?

A. That figure is $983.02.

Q. Per switchboard position used in toll operation in the State of Ohio?

A. That is right.

Q. Then you determined the proportion of a switchboard position that was involved in this average call?

A. That is right.

Q. What is that?

A. This is going to be—this is on an annual basis not- and it is going to be a long decimal; .0000014715719. It is necessary to carry that out to that extent because a small error will result in a very large error in the answer.

Q. That is the cost per long distance call in switchboard expense over the whole system in Ohio?

A. This figure I just gave you?

Q. Yes.

A. No. That is the fraction of a switchboard unit required. Now that was multiplied by $983.02, which product gave .1447 cents as the switchboard cost per unit. I think I detailed in my cross-examination at the previous hearing the method used in getting the operating expense. I think I gave you all of those figures.

To give you a little more detail, adding the .4464 cents, which is the operating cost per unit, to .1447 which is the switchboard cost per unit, gives .5911 cents as the operating [fol. 9660] and switchboard cost per unit. That figure multiplied by 16.11 is 9.52 cents.

I might say in making that computation I dropped the fourth digit, making that .591 times 16.11, giving 9.52 cents as the operating and switchboard saving per single ticket call. That was multiplied by 5,519,900, gives $525,495.00 as the operating and switchbpard saving for the year 1923. Adding to that $44,711.00, which is the circuit saving for the year 1923, gave the total of $570,206.00.

Q. Now have you determined the other savings in that same manner?

A. Practically, yes, the same method, Mr. McConnaughey.

Q. Is that on all of that?

A. Yes, sir.

Q. Now the difference in these two methods, of the single ticket and the double ticket method, is the difference in the making of the two records, isn't it?

A. One of the savings is the elimination of the writing of the ticket at the distant office.

Q. And the time that is saved aside from the writing of

the ticket is made necessary in the two ticket system by the fact that you have to make provision to get the ticket written, isn't it, by advising the ticket operator at the distant point and getting her in on the call?

A. Yes, there are all the points that I mentioned in comparing the two methods that result in this saving; that is, elimination of the ticket and all of the work that is involved before the second ticket is written and all of the work involved after the second ticket is written.

[fol. 9661] Q. In getting into connection with the operator at the distant point?

A. I don't know that I just follow you, Mr. McConnaughey.

Q. The essential difference is that in one system you have only one ticket made, only one record of the call, and in the other system you have the two tickets; incidental to that is the saving in time in connecting with the ticket operator at the distant point and her making the record?

A. That in general is right, only there is a large amount of operating saving——

Q. Incident to that?

A. In addition to the elimination of the writing of that ticket.

Q. Well, there is——

A. It is true that the fact that we do not write the ticket at the distant point results in the saving necessary to write a ticket plus all the other savings that we make because we do not write the ticket.

Q. Yes.

A. That is right, yes.

Q. Tell us why they ever did write the two tickets?

A. Well, in the olden days the toll transmission was not as good as it is today. The A. T. & T. Company have made great strides along that line in recent years. And it was not practicable for the operator at the originating point to deal directly with the subscriber at the distant point; that is, the transmission was not good enough for the operator to get to the called subscriber at this distant point the details of the call; that is, who was calling, etc., and it was not [fol. 9662] good enough for the subscriber to get back to the operator at the originating point any message she may have had; that is, it was necessary for the outward operator to spend a long time dealing with the called subscriber to find out just what the status of the matter was. The transmission was not particularly good.

Q. What do you mean by the transmission; the operation of the apparatus?

A. No, I mean the volume of voice sent over the toll circuit. That is, the subscribers could not hear as well over these toll circuits years ago as they can today.

Q. They had to hear each other over the same circuit?

A. I am going to get to that. It was found that there was considerable circuit time lost in having the originating operator deal with the called station; therefore the method in use was this single ticket method.

Q. The double ticket method?

A. Rather the two ticket method, which provided that the operator at the distant office would deal with the called subscriber. Now it is true that the subscribers had to talk over this connection and the transmission to them was not as good as it is today; but as a rule the calling subscriber and the called subscriber had something in common, and they were able to understand one another better than was the operator and the subscriber. That is one reason.

Another point that has made it possible to extend the single ticket method is the improved toll office management. We have better control over the management of our offices than we did years ago. We have service observing equip- [fol. 9663] ment which provides a means for checking the writing of the ticket at the originating point where there is only one ticket written.

Q. Going back to the circuit proposition, tell me how the writing of the ticket helped the circuit situation any?

A. How it helped it any?

Q. Yes.

A. Well, the originating operator under the two ticket method, as I said, would ring the distant office and ask for the ticket operator and give this ticket operator the details of the call as she had recorded them at her end. Now there is no subscriber's loop in that connection and these operators deal with one another every day and they had a pretty good common understanding so that it was fairly easy for the originating operator to get to the distant operator the details of the call. Then the distant operator dealt directly with the called subscriber and that involved only the subscriber's loop in the local exchange so that they were able to get along very well on the hearing end of it.

Q. What did the writing of the ticket have to do with this connection? What was the second ticket written for?

A. The second ticket was written so that the distant operator would have a record of the call so that she could ring the called subscriber and tell them that Mr. Smith of Cleveland was calling Mr. Jones, and "Is Mr. Jones In?" and if not "When do you expect him?", and she would go back on frequent occasions to the called subscriber in order to complete the connection. If that second ticket had not [fol. 9664] been written there would have been no provision for the distant operator to deal with the called subscriber.

Q. Except her memory?

A. Except by memory, which would not have been at all safe, and it would have been necessary for the originating operator to deal with the called subscriber and there would have been more lost circuit time under that arrangement and more operating labor and more errors than with the two ticket method. However, the improvement in toll transmission, the development of service observing boards by the A. T. & T. Company and the improved toll office management made the operation of the single ticket method practicable and economical, and that is why it was adopted.

Q. Now these two tickets under the old system, did they both figure in the accounting for the toll calls? Were they both turned in to the auditor and checked up against each other?

A. I think they were Mr. McConnaughey.

Q. Now this system, this single ticket method, was that all developed and put into effect at one time as a distinct method or was it a gradual improvement in operating methods that involved several steps before it reached its present status?

A. It was gradual. As I stated in my direct testimony, my first personal knowledge of the single ticket method was seven or eight years ago when I was first assigned to toll traffic engineering, but it is my understanding that the method was introduced some years prior to that time and was extended as fast as toll transmission and improved operating management and service observing equipment [fol. 9665] made it advisable to extend the method until today we are handling every call that it is practicable to handle on the single ticket method.

Q. Well, now, in determining the amount of savings that have been made here, have you offset the additional ex-

pense of improved circuit and service observation and office methods against the time element that you have figured on?

A. Oh, toll transmission was not improved in order to introduce——

Q. That is not the question.

A. The single ticket method——

Q. Wait a minute. That is not the question. Have you figured on that additional expense in arriving at your savings?

A. There is no expense chargeable to that.

Q. Then you have not figured on any expense due to the improvement in your transmission?

A. No, because there is no expense charged in that for this reason. Transmission was not improved simply that we might introduce the single ticket method. It was improved in order to give the public a better toll service. Toll office management was not improved simply that we could introduce this method. It was improved in order that we could improve the service and make operation more economical. Service observing equipment was not developed and installed simply to introduce the single ticket method, but it was put in in order that we might have a knowledge of the grade of service we were giving the public. And the single ticket method is simply a by-product of all these other matters.

[fol. 9666] Q. That is, because you have made all of these improvements which have cost you money, it is possible to do this detail in a little more effective way?

A. No, these other improvements we have made have not cost us money. They have saved us money. That is, improved transmission has saved us money in toll line construction. Improved office management has saved us money under office expense. Service observing equipment has saved us money in operating expense because we know wherein we are weak and where we can make improvement. So all these things have in themselves resulted in savings. But I have not taken any of those savings into consideration. I have simply included in my savings the single ticket method economies.

Q. Do you mean to say the improvement in your transmission has been effected without expense; that it costs less to transmit messages more efficiently in the modern plant or modern system than it used to cost?

A. I do not believe there is any question about that because the use of repeaters, for instance, has decreased the size of the copper wire required, and repeaters will prove in by themselves. That is, it is a matter of economy regardless of transmission.

And thereupon a recess was had until 1:30 o'clock P. M. of same day, Tuesday, May 27th, 1924.

[fol. 9667] Tuesday Afternoon Session

May 27th, 1924.

And also W. T. ANTHONY, resuming the stand for further cross-examination, continued his testimony as follows:

Cross-examined by Mr. McConnaughey:

Q. Mr. Anthony, when your company took over the Ohio State Telephone Company you had some opportunity to observe the practices of that company in the different exchanges?

A. Yes.

Q. Did you find the single ticket method of toll operation used in any of the exchanges?

A. Yes, the single ticket operating method was used to some extent in the Ohio State system when we took it over and shortly after taking it over we extended it to the same extent that we had the method in effect in the Ohio Bell System.

Q. Where was it in use? Was it in general use or just in some particular places?

A. Well, I know it was in use to a limited extent in Cleveland and Toledo.

Q. Of course it was in use at the points with which Cleveland and Toledo connected?

A. Some of the points. I cannot give you the exact figures, Mr. McConnaughey. But I recall hearing Mr. Ide, who was then the general superintendent of traffic, and Mr. Eckley, who was general supervisor of toll traffic, discussing [fol. 9668] the matter particularly after we took over the operation of the Ohio State and at that time it was brought out that the method was used only in a limited way and it was decided at that time to extend it to the same point as the Ohio Bell had had it in use.

I might say in that connection that we have given that

method to most of our connecting companies. In fact, to all of them, and I think most of our connecting companies are now using the single ticket method.

Q. Had you observed it in use any place else outside of the Bell system prior to 1921 when the Bell took over the Ohio State?

A. No, I cannot say that I did, Mr. McConnaughey.

Q. Did you find any machine ringing on manual or automatic switchboards of the Ohio State Company when your company took it over?

A. Yes, we found some of the Ohio State boards equipped with a type of machine ringing circuits.

Q. Did any of the automatic exchanges have machine ringing without the audible tone? I am referring now to the Ohio State.

A. Well, let's see. The Youngstown automatic exchange had machine ringing and the audible ringing tone. Columbus did not. Dayton——

Q. Did not have the audible ringing tone?

A. Did not have machine ringing or the audible ringing tone. Dayton did not and Akron did not.

Q. How about Alliance?

A. I rather think Alliance did have it and I think also [fol. 9669] Washington Court House.

Q. Do you know about when the Automatic Electric Company adopted the machine ringing in its practices?

A. No, I do not, Mr. McConnaughey.

Q. Do you know when the machine ringing was adopted for B boards by the Central Union in Ohio?

A. Not exactly, but it is my recollection that machine ringing B board trunks were in operation when I started with the Central Union Company in 1913; when I was with the Central Group of which the Central Union was a part.

Q. It was in common use then?

A. It was in use; it has been extended.

Q. Extended a good bit?

A. Since that time.

Q. To what extent has machine ringing been adopted for A boards in the Ohio Bell System?

A. We have adopted machine ringing cord circuits in the A boards where additional investment for that equipment can be justified.

Q. Where has it been done?

A. We have machine ringing cord circuits at Akron, Find-

lay, Sandusky, Middletown; there may be other place-; I do not recall those.

Q. Now in an automatic exchange having machine ringing all of the calls have the benefit of that saving, have they not; not only those on the A board or on the B board as in the Bell system in the manual exchanges, but all of them?

A. I don't know just what you mean by saving there. In the automatic system if the office is not equipped for machine ringing the subscriber does his own ringing. There [fol. 9670] is no saving of course on the part of any operators.

Q. They have the benefit of machine ringing on all calls and not simply the B calls in an office that is not equipped for machine ringing on the A board?

A. If it is so provided.

Q. In an automatic exchange there is not the same necessity for the education of switchboard operators that there is in the manual exchange, is there?

A. There are no operators involved in the average machine ringing on automatic calls.

Q. What does it cost to train an operator?

A. I cannot give you a figure on that. It costs some money. I cannot give you any particular sum.

Q. When did you first know of prepay coin collectors being used?

A. Well, they were used—my first personal knowledge of prepay coin box service was in Chicago.

Q. When was that?

A. I do not recall the exact year, Mr. McConnaughey; it was a number of years ago.

Q. When you first went there in 1913?

A. I do not recall whether they had prepay coin box methods in use at that time or not.

Q. Are you familiar with the switchboard in use at Warren?

A. I have seen the board.

Q. At Portsmouth?

A. No.

Q. At Lima?

A. I have seen the Lima equipment.

Q. At Mansfield?

[fol. 9671] A. I have never seen the Mansfield equipment.

Q. At Defiance?

A. I have never seen that equipment.

Q. Are you familiar with the general type of those boards?

A. In a general way, yes.

Q. They are similar, are they not?

A. Well, the Warren board is not similar to the Lima board. I think the Lima Home and Mansfield boards are similar, although as I said I have never seen the Mansfield board.

Q. What is the type of the Lima and Mansfield boards?

A. The Lima board is what is known as auto-manual equipment, manufactured I think by the North Electric Company, and I understand the same type of equipment is installed at Mansfield. I am not positive about that though.

Q. What is the effect of the use of boards such as at Lima and at Mansfield on the number of operators which are required in connection with a full manual board?

A. I would think that the number of operators required should be less for the reason that the investment in equipment is much greater than in the full manual system.

Q. Why is the number of operators less?

A. Because it is a different system of handling calls.

Q. Particularly by automatic machinery, is that correct?

A. Yes, sir.

Q. You have had some consultation with A. T. & T. General Staff experts in reference to machine switching equip-
[fol. 9672] ment in connection with your work?

A. Yes, sir.

Q. Did you consult with them with reference to the changes that were made at Washington Court House when that equipment was taken over? There were some considerable changes made in the equipment there, were there not?

A. We added to the automatic equipment at Washington Court House and I am quite certain that we conferred with the A. T. & T. Company on that matter, because shortly after we merged with the Ohio State Mr. Farnum, local traffic engineer of the A. T. & T. Company, and four or five other A. T. & T. men came to Ohio to assist us in our merged plans and we reviewed practically every job with them and I am quite sure Washington Court House was included.

Q. You made a considerable expenditure there in improvements and additions, did you not?

A. I do not recall how much money we spent, Mr. McConnaughey. We enlarged the system to take care of a greater number of subscribers than the plant in service at

that time had capacity for. In other words we added sufficient equipment to take care of the Ohio Bell subscribers in Washington Court House in addition to the State subscribers that were in the system.

Q. Are you able to state whether or not the effect of your changes and improvements there was to reduce the expense of operation over what it had been over the Ohio State management?

A. Well, we had to increase the size——

Q. Just answer the question. Do you know whether you reduced the operating expense by the improvements that [fol. 9673] you made?

A. We added subscribers to the system; therefore we added plant; naturally we increased the yearly charges, plant charges. I do not recall how many lines were cut over from the Bell office but it was necessary for us to buy equipment for each one of those lines. Naturally our charges are higher than they were before we spent that money.

Q. Yes, the aggregate charge is higher, but was the charge per line higher, do you know?

A. No, I don't know as to that.

Q. You don't know; alright. What change did you make at Alliance?

A. We did about the same thing. We added sufficient equipment in the automatic plant to take care of the Bell subscribers.

Q. And with the same result?

A. Yes, naturally we would have a larger investment for the larger number of subscribers.

Q. Well, now, your company has been working according to fundamental plans developed according to the A. T. & T. System in various exchanges in Ohio for a good many years, hasn't it?

A. Yes, I think that is correct.

Q. And in most all of the large cities of Ohio, including Dayton, you took over the Ohio State properties in 1921. Now in taking over those Ohio State properties did they conform to the fundamental plan that you have been working to in respect to the location of wire centers, building locations, layout of outside plant and so on?

A. Do you mean by that were the wire centers of the Ohio [fol. 9674] State offices in accordance with our fundamental plans?

Q. No, I mean how did the acquisition of that property fit in with your fundamental plans?

A. Well, I cannot tell you that definitely, Mr. McConnaughey, for the reason that fundamental plan work is a function of the chief engineer. The traffic engineer furnishes traffic data and studies for the fundamental plan but the final plan is made by the chief engineer of the company.

Q. And you made no studies for fundamental plans which contemplated the acquisition of such large units or amounts of property as were involved in taking over these Ohio State plants, did you?

A. Yes, for several years prior to the consolidation of the two properties our ultimate estimates, forecasts—I mean by that the station forecasts for the 15 or 20 year periods, were set up on the basis that there would be one operating company in order that the fundamental plan might be so set up at a consolidation so that the plan itself would be adaptable to the conditions on a consolidated basis; that is we for a number of years set up our traffic estimates on that basis, and just how the chief engineer applied that I cannot tell you in detail.

Q. That is, as far as your traffic estimates were concerned you figured that the Ohio Bell would be doing all of the telephone business in these various towns and engineered them in that way from a traffic standpoint?

A. Well, let me explain this, Mr. McConnaughey. The first move in connection with a fundamental plan is a [fol. 9675] commercial survey for a 15 or 20 year period. Now that is based to a large extent on the estimated population at that time. That work is done by the commercial department, and in their ultimate surveys they set up their station forecasts on the basis of one operating company. The traffic engineer is furnished a copy of the commercial forecast by classes of service and he prepares his ultimate traffic estimates on the basis of that forecast which, as I say, was set up on the basis of one operating company.

Q. Has that always been the practice of your company, so far as you know?

A. I rather think it has because it would be quite advisable in starting new projects to have some idea as to what effect a consolidation would have on that project.

Q. You rather think so; what is your information about it?

A. Pardon me?

Q. You stated that you rather thought that that was the case.

A. Well, you asked me if it had always been.

Q. I asked you if you knew whether or not it had always been?

A. I said in answer to your previous question that I know that was the case and has been the case for several years. Now I cannot go back more than 13 years but I would assume prior to that time the same thing was done because it would be quite necessary to have such information.

Q. In figuring the amount and type of equipment for a city under those conditions, that is where you were figuring on a city for 15 or 20 years in advance, and your company [fol. 9676] did not control all of the telephone business in that city, how would you figure the amount and type of equipment?

A. Well, in any fundamental plan the chief engineer sets up several possible conditions; that is, he may, in a city like Columbus, set up as Case No. 1 an ultimate plan having, say, ten central offices located at certain designated points. Plan No. 2, there may be eight central offices. One or two of the areas may be larger than in Plan No. 1, and so on. Usually in a large city there are eight or ten different plans set up. The commercial survey is made by small block areas. And the chief engineer takes that survey and adds up for a given area the lines and stations shown by the various block areas. That gives the number of stations in each possible office area under the eight or ten plans. Now that information is furnished the traffic engineer and we then prepare estimates, equipment estimates, covering various types of equipment, such as automatic and manual, together with the estimated operating cost.

The engineer then takes that data and rounds it up and decides which type of equipment is the most economical and also which of the several plans will be most economical for the future; or it may develop that the final plan will be a combination of two or more of the eight or ten plans suggested.

Now just what allowance the chief engineer makes for the type of equipment that is in service in the independent systems I cannot tell you definitely. Of course a funda- [fol. 9677] mental plan is an indication of the condition that should exist at the end of the 20 year period, say, and then

it is a question of working from your existing plant to that condition in the most economical manner.

Q. Have any of the fundamental plans with which you have had to do taken into consideration the possibility that the Ohio Bell Company would take over the property of an independent company in any community?

A. Yes, all of the fundamental plans that I have worked on since I have been in the telephone business were set up on the basis that in the ultimate period there would be one operating company.

Q. And that would be your company?

A. I don't know whether it would be our company or not, but it showed the requirements on the basis of only one operating organization.

Q. Did you in any of these plans take into consideration the possibility that your company would take over the system of the independent plant and join it to yours?

A. In the fundamental plan studies?

Q. Yes.

A. Now that is a feature of the fundamental plan that the chief engineer would handle with the equipment requirements under the various plans set up.

Q. Now wait a minute. You know of some of these plans. In fact, you know how practically all of the fundamental plans that you have had to do with were finally worked out, don't you?

A. No, not in detail, Mr. McConnaughey, because a fundamental plan is primarily for the outside plant and for the chief engineer's organization. From a traffic standpoint [fol. 9678] we are interested first in giving good service and second in having an economical plant. Now the economies of the plans considered must be decided by the chief engineer because traffic is only one phase of it.

Q. Well, now, I think you can answer this question by yes or no. Do you know of any plan that has been made that has contemplated that the Ohio Bell Company would acquire the property of the Ohio State Company in Ohio now and would join it onto the existing Ohio Bell plant as a part of that plant?

A. Yes, sir.

Q. Where was that done?

A. All of them.

Q. When?

A. All of the plans we have ever made assumed that a

combination of that kind was a possibility for the ultimate.

Q. And you laid out your plans accordingly?

A. Well, I presume the chief engineer, after getting that information—it costs a lot of money to get that information—I presume he most certainly used it in connection with his construction.

Q. Now are we to understand from that answer that according to the practice of the company the plan upon which the plant in Dayton was developed by the Ohio Bell Company contemplated that eventually the Ohio State Company would become a part of that system and be joined onto it and that the exchanges and the wire centers and the layout of the outside plant was designed with that in view?

A. Now that is a pretty long question.

(Question read.)

[fol. 9679] A. In the last *last* of that question when you refer to the location of wire centers, etc., do you have in mind the wire centers of the Ohio State property or the ultimate wire centers for the consolidated plant in Dayton?

Q. I have in mind the Ohio Bell properties as they were laid out.

A. The Dayton fundamental plan was set up on the basis that ultimately there would be one operating organization. As to the location of wire centers and other matters referred to in your question I can give you no detail on that because that is a function of the engineer's office and I am not familiar with it.

Q. That is, you are not able to answer that question?

A. Not in the detail you ask it, no.

Q. Can you answer it particular- with reference to the equipment?

A. That is the same thing; that is a function of the chief engineer's office.

Q. Now you have testified about the overlap ringing method of toll operation. Doesn't this method sometimes create some confusion between the two parties? That is, the distant operator on a toll call starts to ring the desired telephone at the same time the calling operator rings back the party who has originated the call; doesn't the latter sometimes find that no one answers the distant ring or that a wrong number has been rung or so much time elapsed before the proper party answers that the originator of the call feels that he has been called unnecessarily? Do you have any complications of that kind?

A. That is another of the long questions.

[fol. 9680] Q. I have tried to indicate all that I can think of of the complications?

A. I can answer it this way, Mr. McConnaughey. I think you have in mind the possibility of the calling subscriber being brought to his telephone before the called party is ready to talk?

Q. Yes.

A. That might be true under the overlap ringing method. However, it simply means that when he is brought to the telephone at that time he gets a report on the status of the call. He gets his report more quickly than he would under the old method. Under the old method he would still get that report but he would get it after the operator had received the report on the status of the called line. Then she would ring him back, that is, ring the calling subscriber back, and give him the report. Now with the overlap ringing method we fell right on that point particularly it is an improvement over the old method because he gets his report immediately. If the called party does not answer he is right there at the telephone and gets that report. He may decide, or he may have in mind another station in the distant point at which the party he desires can be reached, in which case the other station is rung and his call completed right there.

Q. Now you have spoken of this as a development. What was the process of development by which this practice was brought about, this method of operating?

A. Well, in the first place this method could never have been introduced if the single method had not been developed, because under the two ticket method of course you could not operate the overlap ringing method. The development is [fol. 9681] one that the A. T. & T. experimented on, as I understand it—in fact, Akron, Ohio, was one of the offices where the method was tried out prior to its final adoption. They made studies of methods at various points to determine just what the saving would be and just what the public attitude on the method would be, and it was necessary to develop new operating instructions to make the method effective.

Q. Now you have figured a separate saving on account of this overlap ringing; don't you overlap your savings there? Isn't this really a part of the saving that you effected by the single ticket method?

A. No, no.

Q. How do you distinguish between the saving of time between the one and in the other?

A. The point there, Mr. McConnaughey, is this, that the single ticket method was first introduced and we realized certain savings with that method as against the two ticket method that was in effect. Now I have given the savings on that, which was approximately $570,000.00. Now in addition to that saving the overlap ringing method made a further reduction in the cost of handling calls on the single ticket method. That is the single ticket method was a substitution for the two ticket method. Now the overlap ringing method is a modification or an improvement in the single ticket method.

Q. And a further development of it?

A. Yes, sir, a further development, that is right.

Q. Did you find in the Ohio State property any harmonic ringing on the party lines?

A. Yes, they had harmonic ringing on some of their party [fol. 9682] lines.

Q. What does that accomplish?

A. Well, in what way? It accomplishes the ringing of the subscriber's bell——

Q. A complete selection of an individual party on the line without any confusion with the other party, doesn't it?

A. I don't know just what you mean by confusion. It does provide a selection of the station on the line. There are other methods that do the same thing.

Q. That is, on a four-party line the party called is the only party whose bell rings?

A. That is true.

Q. Do you know how long that system of selective ringing had been in effect on the Ohio State system or any other independent systems?

A. No, I don't know how long it was in effect at independent offices.

Q. Has it been or is it in effect in any of the Ohio Bell properties before the Ohio State consolidation—before the consolidation with the Ohio State?

A. In Ohio?

Q. Yes.

A. I cannot think of a case in Ohio, but the system is one that was in effect in Bell offices. We have circulars covering the full harmonic ringing, A. T. & T. letters covering it. It is something that is available.

Q. What is the Ohio Bell practice on four-party lines? How does the Ohio Bell select a party who is called?

A. We have what is known as semi-selective ringing. If [fol. 9683] there were four parties on a line we have a selection between two of them.

Q. That is, two of the bells would ring with a different signal for each party?

A. That is right. When we ring one subscriber the other subscriber on the same side of the line also gets a ring; it is a different ring for each subscriber so that each one knows when he is being called.

Q. Yes, but each one gets a ring?

A. That is true.

Q. You have in the Ohio Bell some exchanges operating automatic equipment of the manufacture as is used in Columbus, do you not?

A. I do not know whether the Automatic Electric Company installed the Columbus equipment or not. It is very old. I rather think they did, and we do have in Ohio other equipment manufactured by the Automatic Electric Company.

Q. Where is it located?

A. We have equipment at Youngstown, Alliance, Washington Court House, Massillon.

Q. At Youngstown and Massillon you have put in new exchanges manufactured by that company, have you not?

A. Yes, sir.

Q. And you have made additions to the old installation at Alliance and at Washington Court House as you have stated here before?

A. Yes, sir, that is right.

Q. Your department had occasion to engineer these installations?

A. Yes, sir.

Q. You had to do with that, did you?

[fol. 9684] A. Yes, sir.

Q. And you decided upon the amount of equipment that was necessary for the number of lines and the volume of traffic that was to be taken care of there, did you?

A. Yes, sir.

Q. You had the assistance of the General Staff?

A. Yes, they assisted us in connection with those jobs.

Q. And The Western Electric Company?

A. I don't know whether The Western Electric Company was in on all of those jobs or not, Mr. McConnaughey.

Q. And The Automatic Electric Company?

A. Well, they furnished, they manufactured, the equipment.

Q. Was The Western Electric Company in on any of it? Did you consult with The Western Electric Company?

A. Personally I had no dealings with The Western Electric Company. The chief engineer's office deals with that company.

Q. Well, now, at Massillon what sort of a system did the Ohio State have?

A. They had a manual system.

Q. You changed to automatic?

A. Yes, sir.

Q. Of The Automatic Electric Company's manufacture?

A. Yes, sir, that is right.

Q. Who was it that actually decided to adopt the automatic system at Massillon?

A. The management of The Ohio Bell Company made that decision after a cost study had been made by the chief engineer of the company. The commercial department and the traffic department furnished data for that study. The chief engineer set up the final study and recommended to [fol. 9685] the management that an automatic system be installed at Massillon.

Q. Who made the cost study.

A. The chief engineer.

Q. Do you figure on costs in your particular part of the engineering work?

A. Yes, we make some of our own cost studies. That is, get the equipment and plant costs from the other departments and then of course making our own traffic cost study and we round them up. But a study of that kind is coordinated by the chief engineer.

Q. And you decide upon the amount of equipment to be installed?

A. Yes.

Q. Is that right?

A. Yes.

Q. Now, having completed the installation at Massillon, did you find the estimate you had made accurate and the quantity of equipment sufficient?

A. Yes, sir.

Q. It did not require any changes?

A. No, we have made no changes in the Massillon office since then.

Q. At Youngstown you found that two of the units were overloaded, as I understand it?

A. That is two of the connector boards. Each connector board involves not to exceed 100 subscribers.

Q. With eight connectors?

A. The average is eight. There are some boards having P. B. X. boards which have more than eight.

Q. How did you correct that overloaded condition?

A. We corrected that by transferring as a temporary proposition connectors—one connector from other boards. [fol. 9686] Eventually we will get disconnects in those boards. By that I mean subscribers located in those boards will give up their service. The load will drop down to an amount where eight connectors are adequate.

Q. You were able to take care of that overload by making nine instead of eight connectors for the time being?

A. Yes, sir.

Q. That was all that was necessary to be done to correct that overloaded condition?

A. As a temporary proposition but that would not be good practice for normal adjustment. To provide a satisfactory distribution of the traffic in an automatic system requires, as I stated this morning, a large amount of work. It is necessary to have peg count readings made on each one of these many groups at frequent intervals and to study all classes of service assigned to each of these boards, and so on. There is a large amount of work involved in maintaining the proper distribution of traffic in an automatic system.

Q. How does that compare with the work which is necessary to mainrain a proper distribution of traffic in a manual system?

A. It is a bigger job.

Q. A bigger job in the automatic system?

A. Than in a manual, yes.

Q. Why?

A. Because you are not concerned so far as your incoming traffic is concerned with the calling rate by various classes because you have in front of each appearance of every line in the office—we will say there are 8000 lines

in the board; that would be 80 groups of 100. We could [fol. 9687] have sime of those 100 groups with an incoming calling rate five times the average and it would not make any difference to us because every one of those groups appears in each section of the board and it is within access of every operator. However, in an automatic system you are absolutely limited to the number of connectors provided for each 100 incoming terminals and in the case of Youngstown that is eight.

Even a 20 per cent—even a load on one board 20 per cent greater than the average would have a serious effect on the traffic. So that in a manual system we are not concerned with the assignment of incoming numbers for traffic. We are concerned with the location of the lines in the answering jacks which corresponds to line switches in the automatic system. That is another problem in adjusting the load in the automatic system to get the originating lines properly distributed among the various line switching boards.

Q. You have explained that your department, the traffic department, is divided between construction and equipment on the one hand, and operating on the other. Just what work does the operating branch of the traffic department perform in the local exchanges which have automatic switchboards?

A. Now I don't think I stated that our traffic department was divided between equipment and construction.

Q. Equipment on the one hand; leave out the construction.

A. Between engineering and operating?

[fol. 9688] Q. Yes.

A. Those are the two broad divisions.

Q. Yes.

A. Now what is your question, Mr. McConnaughey?

Q. Now what function does the operating branch of the traffic department have to perform in automatic exchanges?

A. Of course in every automatic exchange we have a toll switchboard. We must also maintain an information board so as to give the public the numbers of new subscribers which are added from time to time.

We must also maintain a board for intercepting calls to numbers that have been disconnected or changed. In some automatic exchanges we also have AB toll operation in effect. So that under any automatic system you still have a

certain number of operators on your force, and our operating people of course must handle that end of it.

And our operating people are also interested in the service being rendered in the mechanical office or the automatic office, and they follow the results of automatic operation as shown in our service operations to which I referred this morning.

Q. That, however, is very much less than the same sort of observation in the manual office?

A. Well, I don't know that I would say that it is, Mr. McConnaughey. There is a large amount of work involved in analyzing machine switching service observations and then taking the necessary action to correct any difficulties that are brought out in these operations.

[fol. 9689] Q. More you think than comparable work in a manual exchange?

A. I don't know that I would want to venture an opinion as to the relative amount of work because I have never made a study of that point.

Q. Your company does a good deal of operating for the A. T. & T. Long Lines on toll messages, does it not?

A. Yes, we operate some traffic for the Long Lines.

Q. Is there any general rule which determines whether the A. T. & T. does its own operating or whether the Ohio Bell does the operating for it? How is that work done?

A. No, there is no rule on that. If the A. T. & T. Company has enough traffic to inter-city points to justify a separate operating organization they will set one up. Otherwise they will ask the Ohio Bell to handle it for them. And it helps the Ohio Bell because it makes a larger organization for us, that is, to have the combined traffic, especially in the smaller points, but there is no rule about it.

Q. How is it helpful to you to have a larger organization?

A. Because we get a larger operating organization.

Q. It is more flexible?

A. Yes, sir.

Q. Is that additional expense provided for by the A. T. & T.?

A. Well, there is no additional expense to us. It should save us money because, as I say, it gives us a larger organization.

Q. But it gives you additional work to do. It requires you to employ some that you would not otherwise employ,

[fol. 9690] or at least employ time that you would not otherwise employ?

A. Yes, but they pay us for it.

Q. They do pay you for it?

A. Yes.

Q. Well, that is what I thought you would say. Where in Ohio does the A. T. & T. maintain its own operating force?

A. In Cleveland and Toledo.

Q. Every place else it is operated by the Ohio Bell?

A. We have a switching station at Cambridge, one at Phoneton and one at Maumee, but that is just for the purpose of switching Long haul calls.

Mr. Dotson: Isn't there a switching station at Beaver Dam, Ohio?

The Witness: I think there is, Mr. Dotson. There was one. I don't know that it is still in existence. I rather imagine it is.

Q. Your toll lines are connected with a good many exchanges of independent companies, are they not?

A. Well, yes, sir, we make connections with connecting companies.

Q. And their operators do the operating for some of your messages just as you do for some of the A. T. & T.?

A. That is right.

Q. Do they do operating for A. T. & T. messages?

A. Yes, sir.

Q. You furnish these connecting companies information with reference to your practices for their benefit, as you have stated I think on page 990 of the record?

A. Yes, sir.

[fol. 9691] Q. And that is done with the approval of the A. T. & T. Company?

A. Well, I don't know that they approve it. I haven't heard of them objecting to it. I rather think they would approve it.

Q. For instance, if an independent company makes a request for this circular No. 1200, you furnish it to them?

A. Well, I don't know whether we furnish 1200 to any independent companies that request it or not. It is a question of whether they need it or not. There is a great deal of information in that circular that would not be at all applicable to a small exchange.

Q. How about 117?

A. I rather think they would get that. I cannot tell you just exactly how that is handled because those things would go through the office of the general superintendent of traffic or the division traffic superintendents. I have no direct dealing with connecting companies.

Q. If any of them would come to you for any advice or assistance about a traffic matter would you give it to them?

A. Certainly.

Q. And the commercial department would do the same thing, I assume?

A. I think that they would do so.

Q. Now why do you do this? Is there any benefit to the Ohio Bell that you get from improving the practices of the independent companies with which you connect?

A. Oh, I don't think that we would get any great benefits out of it, but the information is available and we are on good terms with the connecting companies and personally I [fol. 9692] would not refuse them any information that I had.

Q. Is it of any advantage to the Ohio Bell Company in its toll line business connections with the independent companies that it does connect with to have them following what you consider proper practices in conducting their business?

A. Yes, I would think that would be of advantage to the Ohio Bell Company where they connect with us.

Q. And your methods are of advantage to the A. T. & T. Company in connection with its toll line business in the same way, are they not?

A. What do you mean by the A. T. & T. Company now?

Q. The A. T. & T. Long Lines?

A. You mean the Long Lines operating organization?

Q. Yes.

A. Well, the Long Lines operating organization naturally like to know how we are handling things because we must have more or less of a uniform system at each end of the connection in order to avoid confusion.

Q. And it is to its advantage to have you following uniform methods with them and methods approved by the A. T. & T. organization, is it not, so that you will work harmoniously?

A. I would say that it is a mutual advantage.

Mr. McConnaughey: I think that is all we have.

[fol. 9693] Recross-examination.

By Mr. Dotson:

Q. Mr. Anthony, referring to the services of the observing board that you have been explaining, what date is collected by means of this board?

A. Do you have in mind the manual or machine switching?

Q. Well, you have it in both cases.

A. It is very similar; there isn't very much difference. We bring into the service observing board—I am talking now about the local service observing board—we bring into the service observing board a certain number of subscribers' lines. Those lines are changed each day, or every second day, depending upon the volume of traffic, and enough lines are brought in so that the operator or operators, in case we have more than one at the desk, are kept busy. When a signal comes in they cut in on the connection and follow the call, through to completion. For instance, they start their stopwatch when the signal appears because that is an indication that the subscriber has taken his receiver off the hook, and they have split-second hands on the watch and they get the interval required to answer the call, all of this in terms of seconds. They get a record of the trunk assigned, if it is a trunked call. They get a record of the exact second at which the A operator depresses the called circuit key, passes the order to the B operator; they get the exact second the B operator assigns a trunk, the exact second [fol. 9694] she puts the trunk up in the proper multiple jack; they get the exact second that the A operator takes up this trunk at her board and the exact second that the ringing starts on the called line, the time the called party answers, unless the connection is up over five minutes, in which case the service observer drops that call and goes to another. Otherwise she might be tied up for a half hour on one connection.

Now in case the A operator does not properly repeat the number to the subscriber the observer makes a record of that. In case the calling party calls a number and upon being connected with the number says it is the wrong number, a record is made of that. That indicates that he has given a wrong number or maybe had two numbers mixed or had transposed the digits or some error of that kind.

Also if a B operator assigns a busy trunk a record is

made of that. If the A operator takes up the improper trunks, that is recorded. If the subscriber during the course of the connection flashes his operator in, the observer starts her watch at the time the first flash comes in and then makes a record of the exact second that the A operator plugs or gets in on the connection to find what the subscriber has in mind. It gives us a record of every little detail involved in the completion of a call.

Q. In tying in subscribers' lines for the purpose of this observation you say that you tie in as many lines as will keep one operator busy all the time, and if you have more [fol. 9695] than one, then you tie in enough more to keep the second one busy. The object is to have enough lines tied in during the observation period to keep the operator set apart for that purpose busy?

A. That is right.

Q. Now how are these lines selected? Are they selected by classification of service or do you mingle a certain number of lines or apportion them among the different classes of service?

A. Yes, we do. In order to get a representative picture of the service we must observe on all classes of calls.

Q. What I mean is this: we start out today to observe a certain number of lines, the workings of a certain number of lines. Do you, in that instance, tie in a certain number of business phones and a certain number of residence phones? For instance, some business lines, some mercantile lines, some manufacturers lines and some other lines, so as to have practically all classes of service on that board represented?

A. Yes, sir.

Commissioner Poor: Are you trying to elicit the information whether they ever order in lines on the observation board, for any other purpose than the good of the business?

Mr. Dotson: I was coming to that. You may answer that question just as Commissioner Poor has propounded it.

The Witness: No, sir, we do not.

Q. How is that?

A. No, sir, we do not.

[fol. 9696] Commissioner Maullar: You do no detective business?

The Witness: As far as I know we do not. I am not in the operating end of the business, but I know there is noth-

ing put up on service-observing except for routine observations. Now we do have in our chief operator's desk what we call position monitoring jacks where we can monitor any position. That is for another purpose. That is for monitoring to see how well each operator is performing. I cannot answer your question definitely. I have never heard of a case myself.

Q. What is the real value which the company attaches to this information and what particular use is made of it?

A. Well, it is very valuable to us, Mr. Dotson, because it gives us a picture of the grade of service we are giving to the public. If we did not make observations of this kind we would go along month after month and would not have a real definite picture of the kind of service we are giving. We can get some picture of it from observations in the operating room but it is not as definite as this.

Q. Granting the picture and the completeness of that picture as you referred to it, I want to know now the real utility of it?

A. These service observations are taken by the field people, that is the division traffic superintendent and his assistants, and they also come into Cleveland to the general supervisor of traffic and they are analyzed. They are analyzed in order that the operating people can determine wherein the service is weak, if the observations indicate [fol. 9697] a weakness.

They might find, for instance, that in a certain exchange the service is very excellent except for, say, cut-offs. Now they immediately start investigation to see why the cut-offs may be running a little higher than normal. That may involve the plant department in maintenance. We will probably advise them that the condition exists and they then make a special check of that particular office. Or it may develop that some of our new operators are not taking down cords properly, which may result in cut-offs; in which case our operating people will make a special investigation of that matter.

Q. Will the observation show the cause of the cut-off, whether it is due to the operator's improper handling of the cord or whether it is due to some other cause?

A. Oh, no, it will not give that information; but other checks are made to determine the cause of the weaknesses we may find in the observation.

Q. Will the observation tell why certain lines are out of use, out of order?

A. Well, if a line is completely out of order, of course we will not get any calls on that line.

Q. Well, does the observation study assist you in the maintenance of the service where it is cut out in that fashion?

A. Oh, yes. For instance, cut-offs may be due to a line being out of order temporarily, and, as I said before, we refer to the plant department results of our observation and if they indicate that an investigation should be made, [fol. 9698] the plant department makes that investigation.

Q. Isn't it always necessary for the party whose line is out of order to first report it into the repair department before there is any account or record made of the condition of that phone?

A. No, there are many times when a line that is out of order will bring in what we call a permanent signal. The lamp will burn permanently and the plugging in of the cord will not retire the signal, in which case we know that the line is out of order. And we have special equipment at the head of the switchboard where those lines are plugged up. The operator locating this permanent signal will report it to what we call the trouble position. It is plugged up. She immediately makes a report to the repair clerk in the plant department.

Q. Now can any telephone line be tied in to this observation board?

A. Yes.

Commissioner Poor: Does the regular operator know what line is tied in to the observation board?

The Witness: No, sir, the lines are selected in this way, we have what we call a panel and jack record which shows the class of service assigned to each answering jack, but the number of the line is not associated with this record. This record is not kept primarily for assigning lines to the observing desk. It is kept in connection with the assignment of new lines to answering jacks. Now each day, or every second day, depending on how often the line is changed, a clerk goes through this panel and jack record and selects a certain number of one-party business lines, a certain num- [fol. 9699] ber of one party residence, P. B. X., etc. The operators have no indications that any lines in their panels

are being observed. The observing board is—I don't know of a case in Ohio where the observing board is located in the operating room. We usually place it where the operators coming in to work cannot see it and they do not know whether the board is covered or not. We sometimes cover the board in the morning and afternoon. At other times in the morning and evening, and then again afternoon and evening. So that so far as the operators are concerned the board may or may not be covered.

Q. About what percentage of the total traffic is sampled or observed?

A. I cannot give you that figure exactly, Mr. Dotson. I think something over seven per cent.

Q. Is this a daily observation?

A. Day and evening.

Q. Day and evening?

A. Yes, sir, we make sufficient observations on the evening so as to know whether our evening service is as good as service given during the business hours of the day.

Q. Is this handled then day and evening on what you call two tricks of eight hours each, something like that? Do you spend the full day, in other words, in the study or making of observations?

A. I cannot tell you just exactly how the tricks are assigned. This is a little out of my line, but I do know that the board is covered sometimes in the morning and afternoon, sometimes in the morning and evening, and sometimes in the afternoon and evening. Now, how the operating [fol. 9700] people adjust the tricks, I cannot answer that, Mr. Dotson.

Q. Do the operators who make the observation keep a careful tabulation of all the date you have referred to, of each call that goes through and is under observation?

A. Each call that they observe. Now, for instance, we may have 50 lines up and, say, two operators on the job. Now if a call comes in on the first service observing jack, one of the operators will pick that up. If a call comes in on another one, the second operator will pick that up. While they are following the progress of those calls, those two calls, maybe eight or ten more will come in that they do not get.

Q. They do not get them all; they just get those that they pick up?

A. Oh, yes. You could not begin to observe on every call.

Q. However, do they make a separate detailed report on each call that they do observe?

A. That is right. There is a form which has been designed for that purpose. It has—oh, I don't know—40 columns in it, I think, and across the top of this form there are certain items. For instance, the first one is Line Signal. That means the time the line signal comes in. Line Signal Answer. Under that heading will show the interval required to answer the signal. The next heading will show "Connection completed to multiple jack". Say it is a local call; it will show that interval. Another column will show the trunk assigned and the interval under that, and then [fol. 9701] "Trunk Taken by A operator", and the interval under that, and so on. That is a printed form.

Q. All of this data is tabulated as against each telephone number that is observed. In other words, when the subscriber calls, does that record carry the number of the phone that is calling?

A. No, it does not show the calling number.

Q. There is no way of individualizing it then or knowing who is using the phone or anything of the kind?

A. Oh, if we wanted to we could trace that back.

Q. I mean after what you do do?

A. Pardon me?

Q. I mean after the actual record you keep?

A. As I understand it, you ask if we trace that back to the calling station. Maybe I don't understand just what you are getting at.

Q. Let us get at it this way. Do you ever take an individual line, for instance my line in Toledo; for some reason you want to observe my line from my residence, put that under observation. Would you have a record of my line as such, so that anybody following out that record would know it was my line that was under observation?

A. No, we do not put the calling number on this record.

Q. That is what I am after. There is nothing in the record to individualize that phone call and know whose phone it was under observation?

A. Not in that record, no, sir.

Q. What then in this record is there that shows the character of the service which that phone is rendering?

[fol. 9702] A. Well, Mr. Dotson, let me say this first, that this record, this service observing, is not primarily for the purpose of correcting specific causes of trouble. It is for

the purpose of furnishing information as to the grade of service we are giving. Then in analyzing the details of these observations, as I said before, we find that we are weak on a certain point. Outside of these cutoffs the service is running fine. Now if we can just get on top of the cutoffs—cure them, then we will be in fine shape.

Q. Well, the cutoffs would take place naturally in one of the exchanges, wouldn't they?

A. Yes, sir. Then as I say we start our operating people; they know what may cause cutoffs. As I said before, there are certain maintenance troubles, new operators not taking the cords down carefully, etc. They start the campaign on those things, first investigating to see whether it is due to maintenance trouble, whether it is due to operating, and then they take the necessary measures to remedy the difficulty.

Q. Well, just one question further. Do you through this observation board service undertake to observe the defects on any calls that may obtain in any individual line at the request of the user of that line?

A. Not at this board, but we do have facilities right in the central office at the Chief operator's desk where we can observe on any line in the office, just one line at a time, and make a special investigation of the service on that line if [fol. 9703] that is necessary, but that is a separate matter.

Q. How do you calculate the percentages that you work out from the result of your observations?

A. I am not familiar with all the details of that Mr. Dotson. My only function in connection with service observing work is to provide the equipment and I have never had any experience in the summarizing of these observations. That is strictly an operating matter.

Q. With reference to traffic rating, what is that understood to be—traffic rating?

A. Well, that is, as I say, an operating matter and I do not think I can give you the information you want on that, Mr. Dotson.

Q. Do you know what your custom or practice is in the matter in which traffic rating is used, as to whether it is posted up in your office in the way of rating bulletins so that the operators will know the ratings of the various exchanges going to make up the exchange area in multiple offices?

A. I have seen data on service posted on the bulletin boards in the various offices, which records are accessible to the operators.

Q. Do you know what information these bulletins carry?

A. No, I cannot say offhand. As far as I know there is no uniform set-up for that. I think that the field people decide themselves pretty much how they want to show that information.

Q. Is this posted under the heading of traffic rating so that they know exactly what it relates to?

A. It might be. I have also seen figures on the per cent [fol. 9704] of wrong numbers and the per cent of irregularities, etc., posted.

Q. Now you have spoken about provisional objectives. What is a provisional objective?

A. I have not mentioned provisional objectives.

Q. Do you know what it is?

A. Why, that is also strictly an operating point. It has to do with the load to be carried in various offices depending upon the efficiency of the force and so on.

Q. Isn't it true that a provisional objective is what the traffic rating ought to be in any exchange?

A. When you said provisional objective I had in mind what is known as objective load. That is, in setting up our budget each month the operating people assume what the load will be, should be, depending upon the conditions in the office, and then strive to meet that. I do not just get your reference to that term, Mr. Dotson.

Q. Doesn't the company, Mr. Anthony, have a percentage or ratio that goes to make up the measure of traffic efficiency in each exchange?

A. Well, there is this sort of a thing in effect, Mr. Dotson. The company maintains records showing the comparative results obtained in various exchanges in the company, comparing Cleveland, Columbus, Dayton, and so on.

Q. This is tabulated and the record shows the percentage of traffic which each exchange handles, showing the degree of efficiency with which the traffic is handled?

A. I don't know just what you mean by efficiency. We [fol. 9705] also make comparisons of the loads carried in various offices, those loads being expressed in terms of units, which is a common factor and applies to all exchanges.

Q. Now these units, what do they represent?

A. Well, they represent the average units carried per busy hour position and the average units carried per employe hour.

Q. Now the record that I refer to takes into consideration the number of operators which you employ to handle the

traffic or the business and it shows the amount of traffic that number of operators is handling. Doesn't that study show not only the amount of traffic they are handling, but also shows the degree or percentage of traffic which they are handling in proportion to the amount of traffic they are rated to handle? Do you understand what I mean? If not I will put it this way. You have a given number of operators; those operators are serving in a certain exchange. Now isn't it true that these operators are supposed to handle a certain amount of traffic during a given period? That is true, isn't it?

A. In a way, yes. We make an estimate of the average load that can be carried per operator based upon the conditions obtaining in that exchange, the experience of the force, etc., and then from our monthly peg counts we determine just what the load was; in other words, get the actual load per operator, and comparisons are made between those two figures; that is, the estimated load and the actual load. In other words we try to keep a line on the efficiency of operators. If a given office is not carrying loads as high as it is estimated they could carry our field [fol. 9706] people immediately start an investigation to see why they are not able to carry those loads.

Q. That is ascertained by fixing what may be termed the maximum load which should be carried, which we will say, for convenience, is 100 per cent. Now your study and observation of the actual work done we will say shows they have only taken care of about 70 per cent of the amount that they are rated to handle. Now that determines the efficiency of the service, does it not?

A. It is not set up in just that way, Mr. Dotson. Let me give you an example.

Q. Very well.

A. The conditions in a certain exchange may be such that it is estimated that the units per employe hour that should be carried are, say, 135. Now each month we make our regular peg count and obtain actual data as to the load carried. Now that load actually carried may be 133 or 137. There are several factors that may influence the load carried. For instance, in setting up the estimated load it is necessary to forecast the amount of traffic we will have at this future period. Now naturally we are not going to hit that 100 per cent right.

Q. That also determines the number of operators you have?

A. Yes, sir, and we provide our operators on a basis of that estimated traffic. If the traffic is, say, two per cent lower than we estimated, naturally the load per operator is somewhat lower than estimated.

Q. I want to make myself clear. The point I want to get at, Mr. Anthony, if you are in position to answer, is [fol. 9707] the character of the service which is being rendered, how well it is being rendered by the operating force. That takes into account lost calls and delays of different kinds that enter into handling the service which in the end constitutes the efficiency of the service. Now how do you arrive at that? Don't you arrive at that result in order to know how well the service is being handled?

A. Yes; the service observations that we were discussing a short time ago are summarized for each office and then comparisons are made of the service rendered to the subscribers in various exchanges.

By the way, the service observations indicate the grade of service the public is getting, whether or not the company or the public is responsible. That if, is a subscriber gives a wrong number himself, that enters into the service calculations the same as if the operator connected to a number other than the one called.

[fol. 9708] Q. That study shows then how well the operating force meets the traffic condition, does it not?

A. Well, it shows the grade of service the public is getting. For instance, for a given period the operating may be perfect, 100 per cent perfect, and yet the subscribers may not be using their directories, they may be calling wrong numbers, in which case the service to the public is not perfect, and that is reflected in the service observations.

Q. But your service observations of course show whether the troubles mentioned by you are due to the faulty use on the part of the calling subscriber or whether it is due to the faulty operation on the part of the operating force?

A. That is true. But in summarizing the results the total is taken into consideration. However, in applying the data for corrective purposes, we take into consideration the details of the call, whether it is the subscriber or the operator who is responsible for the error.

Q. This information is what we call then the traffic rating is it not?

A. Yes, it is sometimes called the traffic rating.

Q. Do you know what the provisional objective is for such an exchange as Cincinnati and Cleveland?

A. Well, I don't know just what you mean by provisional objective, Mr. Dotson. The last time you asked me that question I mentioned estimated loads. If you are talking about service, the objective is perfect service, of course.

Q. I think we understand one another, although I may not express it just as you would. It is the percentage of [fol. 9709] efficiency of the service as it is handled by your operators, your operating force, if that makes it clear to you. You have spoken about a traffic coefficient. What is the coefficient for a flat rate A board say with 1-D or ten relay equipment?

A. The coefficient for a flat rate call, completed direct in the subscribers multiple of a 1-D board is 1.

Q. Is 1, yes. What is the coefficient for a 9-C or 9-D?

A. The same kind of call I think the coefficient is 1.3.

Q. What is the coefficient for 1-C equipment?

A. For the same kind of a call the coefficient of a 1-C board is .87.

Q. Why should it be so much lower, that is this 1-C equipment, than 9-C or 9-D equipment?

A. Well, you have got a different type of switchboard. The number 1-C switchboard is a much more expensive type of equipment. And has features that cut the operating work.

Q. What features do you refer to?

A. Well, one for instance is the machine ringing A cord, or as it is sometimes called, automatic A-board ringing. That type of cord circuit is provided in the 1-C board at a greater expense than the cord circuit than the 1-D board, and to offset that additional investment in equipment we get a higher operating load.

Q. Which is your practice in ordinary use of these boards, that of the 1-C equipment or of the 9-C or 9-D?

A. Well, the No. 9-C board is limited to 800 lines I think.

[fol. 9710] Q. 800 and less?

A. Yes, I think that is right. Let me check that. Yes, the maximum number of lines that can be handled on a No. 9-C board is 800. The maximum number of lines that can be handled on a 1-D board is three thousand. On a 1-C board we can handle as many as 9,600 lines, so that the

size of the exchange determines the type of switchboards to be installed.

Q. What equipment do you use in Toledo, do you know?

A. Yes, in the Bell exchanges we have what we call the No. 1 type of type of switchboard.

Q. No. 1-C?

A. No, not 1-C, just number 1.

Q. Just No. 1?

A. No. 1 that is right.

Q. What is the traffic coefficient on that?

A. On a flat rate call completed direct in the subscribers multiple the coefficient is 1.

Q. Well, the equipment you have mentioned as being in use in the Toledo office, that is not as efficient as the 1-C equipment is it?

A. Yes.

Q. Doesn't the difference between the traffic coefficients indicate a difference in efficiency?

A. In considering efficiency, Mr. Dotson, we have got to consider in addition to the operating expense the investment in equipment. The No. 1-C equipment as I said before is much more expensive than the No. 1, although it does result in higher load. But in considering efficiency you have got to take both the investment element and the operating expense element into consideration.

Q. As a matter of fact, the 1-C equipment is more satis- [fol. 9711] factory to the subscriber than the other because of the rapidity with which you can handle the service is it not. You can handle the service much more rapidly over the 1-C than you can over the other?

A. Oh, I would not say that Mr. Dotson.

Q. Haven't you made a study of it so that you are able to say which gives the faster service?

A. Well, as I said yesterday the speed of answer does not depend upon the type of switchboard installed. It depends upon the number of operators you provide to handle the traffic.

Q. Isn't it a fact that figures of your own company show that the 1-C equipment is 13 per cent faster in service than the other?

A. No.

Q. It is not?

A. No, sir.

Q. You know that to be a fact?

A. Yes, because on a 1-C board we would provide a certain number of operators to give us a reasonable speed of service. Now on a No. 1 board we would provide a few more operators to give us the same reasonable speed of service, but would save money in plant investment.

Q. How does it come then Mr. Anthony, that you have given us a coefficient here of 1 in the one type of equipment and .87 in the other?

A. Well, those coefficients, Mr. Dotson, do *you* represent speed of service at all. Those coefficients represent the amount of work involved in completing this type of call I mentioned on each of the boards. Now the signals are answered just exactly on the No. 1 board as on the No. 1-C board, but after the signals are answered the operator has [fol. 9712] a little less work to do on the No. 1-C board than on the No. 1 board.

Q. In what respect?

A. In the 1-C board the ringing is automatic. On the No. 1 board the operator does her own ringing. That is the main difference between the two boards.

Q. Isn't it a fact, Mr. Anthony, that on the 1-C equipment the calling subscribers bell, or the called subscribers bell rings immediately or quicker on the 1-D equipment or the 1 equipment as you call it?

A. Well, to this extent, Mr. Dotson, that on the 1-C board when the operator plugs into the called line ringing starts. On the No. 1 board, or the No. 1-D board, she plugs into the called line with one hand and at the same time reached for her key and starts ringing with the other. There may be a fraction of a second difference there. I couldn't say what it is.

Q. Well, then in the 1-D board the promptness of ringing the called subscriber depends upon the promptness with which the operator does the ringing, whereas in the 1-C equipment the ringing is made direct and promptly upon the call being placed?

A. That is true, that the ringing is done by machines on a 1-C board, but on the number 1 boards our operators are trained to handle their cords and keys in a certain way, and as I say she puts a cord up with one hand and at the same time she is pressing her ringing key with the other. That is part of the routine.

Q. That is the method or manner in which the call is handled in the 1-D board, but on the 1-C board it is machine ringing?

A. That is right.

[fol. 9713] Q. It goes right through?

A. The difference is that one is machine ringing—the difference is that on the one board it depends on the ambidexterity of the operator.

Mr. Burr: And sometimes the button is pressed by the operator even before the cord is put up, so that the ringing is started the moment that the cord is put up?

The Witness: That is likely to happen. The two are——

Mr. Burr: Simultaneous.

The Witness: Yes.

Q. Do you know what the local calling rates are in Toledo?

A. I haven't the details of the calling rates with me, Mr. Dotson. They vary in different offices.

Q. So you don't know what they are in Toledo. Could you furnish them to us?

A. Yes.

Q. You can?

A. We have such information as a matter of record.

Q. Can you furnish us the calling rates for other cities as well?

A. What cities for instance?

Q. We will say Akron and Canton?

A. That information is available.

Q. Is it for all of the cities involved in this matter?

Mr. Burr: What materialty has this with reference to this license contract?

Mr. Dotson: This license contract takes on something more than just the license contract aspect. It has ramifications that are material in the local rate studies. We have [fol. 9714] the witness here and I assume that you would prefer to have it facilitated as much as possible. If we can get this information we would like to have it. Now certain cities are involved in this hearing directly, naming them, Akron, Canton, Cleveland, Columbus, Dayton, Massillon, Toledo, and Youngstown. We would like to have the calling rates in those various cities.

Mr. Burr: I question whether the gentlemen representing those various cities want that information in the record. We are perfectly willing to give it to you for Toledo, which is the city represented by you, but it seems to me we are unnecessarily encumbering the record.

Mr. Dotson: I am asking it in my own behalf for the Toledo study. We have the witness on the stand. I ask it because he is on the stand now. It will save the time to get it some other way.

Mr. Burr: We will reserve our exception.

Mr. Dotson: All right.

Q. Can you tell us the ultimate capacity of an A board, Mr. Anthony?

A. It depends upon local conditions, Mr. Dotson. Also the type of switchboard. We have A boards of various capacity and the capacity of a particular type of A board will vary according to local condition, such as——

Q. What are some of those conditions?

A. Now, by capacity, I presume you have in mind, line capacity.

Q. Yes.

A. Is that right?

Q. Yes.

A. Well, two of the factors that will control the line capacity of an A board are, first, the number of answering [fol. 9715] jacks per panel, and, secondly, the amount of outtrunk multiple required. The answering jacks per panel vary with the calling rate per line. The outtrunk multiple requirements vary with the amount of trunking.

Q. Can you give us a general estimate of the ultimate capacity of an A board then?

A. No, I cannot Mr. Dotson, because no two are alike. It depends entirely on local conditions.

Q. Do you know what the capacity is in Toledo?

A. You mean for the average office in Toledo?

Q. Well, take it in the old Ohio State exchange, the old sterling board there; you have the old sterling board I understand?

A. Yes. No, I cannot give you that information off hand. I don't recall how many answering jacks per panel there are in that board nor how much outtrunk multiple is provided.

Q. Mr. Anthony, you have in a former statement rela-

tive to the multiple lamp signals stated that it was only effective in exchanges up to three thousand stations. What is the effect of the multiple lamp signals on boards under three thousand capacity?

A. Well, I think I said that in general that type of board is provided in exchanges not exceeding three thousand lines. I think I said that.

Q. You limited it to three thousand capacity?

A. Yes.

Q. That is my recollection. What is the effect of the multiple lamp signals on boards under that or within that [fol. 9716] capacity.

A. In what way do you mean, Mr. Dotson?

Q. Well, what particular advantage is there in handling traffic on a board of that capacity?

A. Well, if you have in mind from a service standpoint, there is no advantage that I know of.

Q. Does it have a tendency to speed up the service at all?

A. No. That is the same proposition that we were discussing for the 1-C board. The speed of answer is entirely a matter of the provision of operators, that is, the number of operators.

Q. Does it have any effect on the number of operators required?

A. Yes, higher loads are carried on that type of board. But on the other hand your investment in plant is much higher than with the other type of switchboard.

And thereupon a recess was had until ten o'clock, Wednesday Morning, May 28th, 1924.

[fols. 9717-9940] **Oral Evidence in "Service Connection Charge Case", No. 1728**

[fol. 9941] HEARING OF FEBRUARY 2, 1922

Part 2

And also CHARLES P. COOPER, called on behalf of The Ohio Bell Telephone Company, being first duly sworn, testified as follows:

Examined by Mr. Burr:

Q. Your name is Charles P. Cooper?

A. Yes, sir.

Q. Where do you live?

A. Cleveland, Ohio.

Q. What connection, if any, have you with The Ohio Bell Telephone Company?

A. Vice president and general manager.

Q. How long have you been associated with that company or other Bell Companies?

A. For some 14 years.

Mr. Burr: May I say to the gentlemen here in the room that Mr. Cooper has been on the stand several times before this Commission and in each case has qualified and has given his experience and I think you may assume from the fact that he is vice president and general manager of The Ohio Bell Telephone Company that he is undoubtedly qualified to speak with authority on the subjects that he will discuss. If you gentlemen concur with me in that view I will not seek to qualify Mr. Cooper any further but will stop with his qualification.

Voices: That is sufficient.

Q. Mr. Cooper, in connection with the service connection charges, have you prepared a chart and a routine showing the various steps incident to each operation involved in installation, re-installation, re-connection, disconnection [fol. 9942] and removals?

A. Yes, we have prepared a chart showing the principal operations in connection with a new connection and with a disconnection and supplements those charts with notes covering the principal operations that are performed in the different departments in establishing and dis-establishing service. There are many minor operations and items of work necessary; associated records that are not referred to on these charts.

Q. Look at the chart which, with the attached 19 pages may be marked Cooper Exhibit No. 1, and tell the Commission whether that is the chart to which you refer?

A. Yes, sir, it is.

Q. And the pages of descriptive matter attached to the chart, if I correctly understand you, outline some of the movements and operations necessary and incident to installations and the other methods which we have under consideration today?

A. Yes, sir, they do; and the chart in addition to explaining some of the principal operations indicates, for each copy

of the order that is prepared, the path that that copy follows from the time the original order is written until it is completed and that copy filed.

Mr. Burr: We offer Cooper Exhibit No. 1 in evidence.

And thereupon the document last above referred to is admitted in evidence on behalf of The Ohio Bell Telephone Company and is herewith submitted and marked Cooper Exhibit No. 1.

[fol. 9943] Q. Have you given some consideration to the nature and extent of the various lengths of life of telephone stations?

A. Yes, sir, we have given considerable consideration, to that *that* have conducted extensive studies. In particular we have made an analysis of stations discontinued for a six months' period from December 1st, 1920, to May 31st, 1921, in four of our exchanges, one in each of the second, third, fourth and fifth classes proposed and from that analysis have prepared a table showing the nature of the variation in life and the extent of that variation based on those analyses.

Q. Look at the chart which may be marked for purposes of identification as Cooper Exhibit No. 2 and tell the Commission whether or not that shows the average life of stations and the percentage of total stations terminated?

A. Yes, sir, it does.

Q. I wish you would explain to the Commission, if you please, the working of that chart, not going through all of the figures, but illustrating by one set of figures so that the Commission and the other gentlemen here may understand just how the chart works.

A. In Column A is shown the names of the four exchanges, namely, Cleveland, Columbus, Canton and Nelsonville.

Q. What are those exchanges and why did you choose them?

A. Cleveland is in class 5, Columbus in class 4, Canton in class 3 and Nelsonville in class 2. We selected one in each of the four classes for this analysis to determine the nature and extent of the life of stations discontinued during this period and to see what, if any, similarity there is between [fol. 9944] these different exchanges, even though they vary in size and in development.

Q. Did you make your choice of those four cities with reference to their being typical or for any other reason?

A. Because we thought they would be typical of the conditions that would apply and be found throughout the territory.

Q. Now where did you obtain the figures shown in your column marked "Average life in months"?

A. Each station terminated during the six months' period had a certain life in months up to the time of termination. All of those ages were tabulated and then divided for each of these classifications by the number of stations involved to get the life in months. That average life, in the case of business main stations in Cleveland, as shown in Column B, line 1, is 26.3 months; for Columbus business main stations shown on line 9, column B, 26.6 months.

Q. Now then you took, in line 1, all the way across the Exhibit, a total number of stations for each exchange, and I will ask you first to tell the Commission where you secured that total.

A. The last total to the right on the statement for example in column W is business main stations, Cleveland, shown on line 1, is 2881. That is the total number of business main stations terminated during that six months' period in Cleveland. The analysis of all of the details shows that 2,133——

Q. That is coming back to the third column?

A. Coming back to Column C; 2,133 of those stations or [fol. 9945] 73.03 per cent of the total had a life of 26.3 months or less. In other words, 2,133 stations did not live in excess of the average life of the total of 2,881. Then as we go across the form in columns D, E, F, and so forth, we have entered, under each of the headings shown, the number of months specified, and the number of stations terminated up to that period. For example, in column I under the six months' period we have 614. That means that 614 out of that total of 2,881 were terminated within six months or less, and so on across the form until we get the total in each class.

Q. Now does the same computation and the same process and method apply to all of the other classes of service and to each of the other exchanges shown in the Exhibit?

A. It does.

Mr. Burr: Is there anything about the Exhibit that any

of the gentlemen here do not understand that they would like to have me ask further of the witness?

Mr. Shuler: I would like to have the number of years specified there. I haven't got that through my head.

The Witness: We have carried that out by months up to and including 12 months, and then in order to condense it and get it into a statement of this size we have taken two years, three years, four years, and so forth, up to 20 years and in the last column over 20 years.

Mr. Shuler: That is 100 per cent changed in 20 years; 99.97 per cent changed in—or 98.96 changed in 15 years?

The Witness: 15 years or less. Now, if you want to get the number of stations that had a life in excess of 15 years [fol. 9946] you deduct the 2,851 from the 2,881 which would be 30 stations. 30 of those stations have been in service for 15 years or more, or for over 15 years.

Mr. Shuler: And it means—the number of years service means the number who had it less than the number of years at the head of the column?

The Witness: Put it this way; had a life not exceeding the number of years specified.

Mr. Shuler: All right; I have it.

Mr. Burr: We now offer Cooper Exhibit No. 2 in evidence.

And thereupon the table last above referred to is admitted in evidence on behalf of The Ohio Bell Telephone Company and is herewith submitted and marked Cooper Exhibit No. 2.

Chairman Poor: Just a minute until I get this straight. In Column D, does that mean of the number 2,881 that were discontinued 74 of them have only operated for one month?

The Witness: One month or less; and similarly in the next column 174 including that 74 had been in service for 2 months or less. The figures are cumulative as they go across to the right of the form.

Mr. Dotson: To make it clear, I do not believe I understand the figures 2,133 in Column C; how do you arrive [fol. 9947] at that?

The Witness: 2,133 of these stations had an average life of 26.3 months or less. 26.3 months is the average life. Now if you go across the form to between two and three years you will notice the number not exceeding two years in life was 2,057 and not exceeding 3 years was 2,305. This 2,133 is in between those two points.

Mr. Dotson. I see.

The Witness: And that column was put in just to show the number of stations not having a life in excess of the average of the total.

Mr. Dotson: All right; I have it now.

By Mr. Burr:

Q. Look at the chart which may be marked for identification as Cooper Exhibit No. 3 and tell the Commission what that is, if you please.

A. Exhibit No. 3 is based on the same information and same analysis as Exhibit No. 2 and states the same information in another form. In column 1 we have entered the period of the life expressing that as a percentage of the average life of the stations and then across the page; for example, in columns 2, 3, 4, and 5, for Cleveland we have shown the average of stations not exceeding that per cent of the total life for each of the four classes analyzed, namely, A, business main stations; B, residence main stations; C, business extensions and P. B. X. stations; D, the total of all stations.

Mr. Shuler: What is P. B. X. stations?

Mr. Burr: Private branch exchanges.

[fol. 9948] The Witness: This statement is prepared to show that there is a fairly uniform relation in the percentage of the stations terminated within any specific period of the total average life in the various size exchanges. For example, looking opposite 100 per cent in column 1, in column 2, the business main stations, Cleveland, 74.03.

Q. That is under A?

A. Yes, sir; and in Column 6, Columbus, A, 74.29. That shows that whereas there was a variation in the average life of from 26.3 in Cleveland for those stations to 26.6 moves in Columbus, that the percentage of the total stations for that period or less than that period was practically the same. A similar relation will be found to exist throughout the statement.

Mr. Burr: We offer Cooper Exhibit No. 3 in evidence.

The Witness: These statements both indicate and reflect very clearly the relatively short life of the stations terminated and that those stations had a very high rate of turnover also.

Mr. Leach: May I ask in that column 1 of Exhibit 3 what the figures in column 1 represent?

The Witness: They represent the period of service, expressing that as a per cent of the total life. For example, Mr. Leach, immediately under 100 per cent we have entered the average life in months of the stations analyzed; in that case 74.03 is Cleveland. Column 2 is the same as the 74.03 that you will find on Exhibit No. 2 in column C.

[fol. 9949] Mr. Shuler: In other words, the average life is 26 months?

The Witness: 26.3 for those particular stations.

By Mr. Burr:

Q. What have you to say, Mr. Cooper, on the subject of the variation in life of active stations?

Mr. Dotson: Before you go to that I would like to ask another question.

Mr. Burr: All right.

Mr. Dotson: To what extent, Mr. Cooper, does the information disclosed in Cooper Exhibits Nos. 2, and 3 respectively, affect the question of charges that is before the Commission at this time?

The Witness: In this way, that it brings out very clearly the very high rate of turn-over of stations with a relatively short life. Now, the analysis that we go into now of active stations or stations in service on a given date, on the other hand, will indicate that there is a considerable number of stations that have a relatively long life.

Mr. Dotson: Well, in other words, then in cases where service is abandoned by subscribers that is taken into consideration in arriving at these figures?

The Witness: Where service is discontinued for any reason whatever——

Mr. Dotson: So that the life as shown here does not depend upon the wearing efficiency or life of the material or equipment?

The Witness: No; we are talking now about the life of the [fol. 9950] service rather than the equipment or plant.

Mr. Dotson: That is the point I wanted to get at.

Mr. Harshman: In making up these two Exhibits have you taken into consideration the phones which are disconnected for non-payment, or only those that are actually taken out?

The Witness: No, they are not included, unless, Mr. Harshman, they might be stations that were disconnected

for non-payment and then permanently left disconnected without service being restored; those would be included.

Mr. Burr: Now, please read my former question.

(And thereupon the pending question was read as follows:

"Q. What have you to say, Mr. Cooper, on the subject of the variation in life of active stations?")

A. An analysis and study has been made of active stations that is stations in service on a given date covering 10 per cent of the stations in these same four exchanges as of June 30th, 1921.

Q. Look at the chart marked Cooper Exhibit No. 4 and tell the Commission whether that is the one you refer to in your last answer.

A. Yes, sir; that chart has been prepared from that analysis and shows the average life of those stations and a number for varying periods of life arranged in a manner similar to that of stations discontinued as shown on Exhibits 2 and 3.

Mr. Burr: We offer Cooper Exhibit No. 4 in evidence.

[fol. 9951] And thereupon the chart last above referred to is admitted in evidence on behalf of The Ohio Bell Telephone Company and is herewith submitted and marked Cooper Exhibit No. 4.

The Witness: This brings out clearly that the average life of stations still in service on June 30th was considerably in excess of the life of stations terminated during the six months' period that was analyzed. For example, the business main stations in Cleveland as shown in line 1, Column B, had an average life of 45.4 months, and those stations are still in service or they were in service or they were in service at that date. These totals under the various periods of months specified in years total across the page cumulative in the same manner as on Exhibit No. 2, showing for example under "Business main stations, Cleveland 2,617, total of a life not exceeding over 20 years; 2,604 as shown in column W with a life not exceeding 20 years.

Mr. Dotson: How did you select your 10 per cent. of the subscribers from which this record is made?

The Witness: We took the line numbers at random. For example, in one exchange we start with line 1, 11, 21, 31,

41 and so forth, all the way through. In another exchange we may have taken 2, 12, 22, and so forth. But the selection was made in that manner.

Mr. Dotson: And by stations you mean the various individual telephone installations?

The Witness: Yes, sir. Now from this study it is quite [fol. 9952] clear that we have a considerable number of stations that had a relatively long life. For example for the Cleveland residence main stations it appears that 50 per cent. of those stations have been in service for two years or more; 39 per cent. have been in use 3 years or more; 32 per cent. have been in use for 4 years or more and 25 per cent. for 5 years or more and 8 per cent. for 10 years or more.

Mr. Dotson: That is not shown in the chart or Exhibit submitted is it?

The Witness: Yes, sir, it appears here; for example, the residence main stations, Cleveland, as shown on line 3 under column P 50.3 per cent. had a life not exceeding 2 years.

Mr. Dotson: Oh, yes.

The Witness: That means that 50 per cent. then had a life of over 2 years, and so on across. Those percentage figures that I read can be obtained right from line—I beg your pardon, it is line 4.

Mr. Dotson: Yes, line 4, column P.

The Witness: Yes, sir; for 2 years, and for 5 years it would be column T and for 10 years it would be column U.

By Mr. Burr:

Q. Look at Cooper Exhibit No. 5 and tell the Commission what that is if you please.

A. Exhibit No. 5 is based on the same information as Exhibit No. 4; that is an analysis of 10 per cent. of the active stations in service on June 30th, 1921, and is arranged so as to show the percentage of stations of each class of a given life expressing that life as the percentage [fol. 9953] of the average life, and on this statement immediately under the line showing 100 per cent. we have also included the average life in months for the stations in each class. For example, in column 2, Cleveland business main stations, 45.4 months.

Mr. Burr: We offer Cooper Exhibit No. 5 in evidence.

And thereupon the chart last above referred to is admitted in evidence on behalf of The Ohio Bell Telephone Com-

pany and is herewith submitted and marked Cooper Exhibit No. 5.

Q. Mr. Cooper, calling your attention to your Exhibit No. 4 again, you were asked by one of the gentlemen in the room as to where you got your percentages, and I think you referred to the third line, columns P. r and S, and you spoke of 50 per cent. and 39 per cent. and 32 per cent. and so forth. Now those per cents. were obtained, were they not, by subtracting the per cents.—and I will not give them by hundredths—of 50 per cent., 61 per cent., 69 per cent., and so forth, from 100, were they not?

A. Yes, sir.

Q. I sould have some line 4 instead of line 3 for I think you corrected that did you not?

A. Yes, you corrected that.

Chairman Poor: Where did you get your Column P, and so forth, on Cooper Exhibit No. 4?

[fol. 9954] Mr. Burr: Oh, in this copy that the Chairman has it has not the alphabetical marks or numbers.

Chairman Poor: I understand what you mean by it.

Mr. Dotson: I think, Mr. Cooper, in your testimony in chief, in referring to the ten year period that you mentioned that it was under Column U; that that is under column 7 is it not, the percentages for the ten year period?

The Witness: Well, that percentage would be 100 minus the 92.29?

Mr. Dotson: Well for the ten year period it would be under column T instead of column U; I understood you to say Column U.

The Witness: The copy I have is marked "U". There must have been some error made in marking them.

Mr. Dotson: It is marked "T" here.

The Witness: Marked "T"?

Mr. Dotson: Yes.

Mr. Burr: Well, let us get that right.

The Witness: It is marked "U" on my copy.

Chairman Poor: They left out the "Q" on some of them.

The Witness: That is the trouble, yes, sir.

Mr. Burr: We will substitute a corrected copy for the record and will make a correction on those Exhibits that have been passed around among counsel.

By Mr. Burr:

Q. Mr. Cooper, have you summarized the average life in months for terminated and active stations in line with your Exhibits 2, 3, 4, and 5?

A. Yes, sir, those have been summarized and put together [fol. 9955] in statement form, the statement indicating the average length of life in months for all classes of stations as computed in accordance with the two months that I have just described; first "A", terminated stations from January 1st, 1921 to May 31st, 1921" and "B, 10 per cent. of the active stations as of June 30th, 1921."

Q. Is that information summarized in the writing marked Cooper Exhibit No. 6?

A. Yes, sir, it is.

Mr. Burr: We offer Cooper Exhibit No. 6 in evidence.

And thereupon the document last above referred to is admitted in evidence on behalf of The Ohio Bell Telephone Company and is herewith submitted and marked Cooper Exhibit No. 6.

The Witness: That summary indicates that there is a rapid turn-over of stations largely caused by the rate of turn-over or the rapidity of movement within the short term classes and emphasizes the necessity for the securing of reasonable protection against unwarranted service connection expense due to the short term of service users.

Q. What have you to say on the subject of the expense incurred on account of station movements?

A. The expense incurred on account of station movements is a substantial item of expense to The Ohio Bell Company and include those items of cost that go with establishing service and discontinuing service and moving of [fol. 9956] service as distinguished from the rendering of service to stations continued. New subscribers are being added to the system constantly from day to day; existing subscribers are being lost, having the service discontinued and other subscribers are moving from place to place. During the period from January 1st, 1917 to January 1st, 1922, in the territory formerly operated by The Central Union Company and The Cleveland Company it was necessary on the average to connect 5.38 telephones to secure a net gain of 1. The extent of that station movement and its

relation to growth is indicated in the statement that I have prepared for that 5 year period.

Mr. Burr: That statement may be marked for identification as Cooper Exhibit No. 7, and we offer it in evidence.

And thereupon the statement last above referred to is admitted in evidence on behalf of The Ohio Bell Telephone Company and is herewith submitted and marked Cooper Exhibit No. 7.

The Witness: During that period the total number of stations installed, re-installed and re-connected was 409,785. The total number of stations taken out, that is disconnected and removed was 340,847. The net gain was 76,185. The number of stations into the number of stations gained is 5.38, and that is divided into:

A. Stations put in for new subscribers, 3.71, and B. Outside moves of existing subscribers, 1.67.

[fol. 9957] Q. Have you prepared an Exhibit showing the extent of station movements and the relation to stations in service?

Mr. Dotson: Are you going into a new subject?

Mr. Burr: This is very similar.

The Witness: Yes, a statement has been prepared comparing the total volume of the Company's station movement, divided between stations put in and stations taken out for each of the classes of exchanges in the territory formerly operated by the Cleveland and Central Union Companies, which brings out the high rate of station turnover.

Q. Is the statement to which you refer the one which is marked as Cooper Exhibit No. 8?

A. Yes, sir, it is.

Mr. Burr: We offer Cooper Exhibit No. 8 in evidence.

And thereupon the statement last above referred to is admitted in evidence on behalf of The Ohio Bell Telephone Company and is herewith submitted and marked Cooper Exhibit No. 8.

The Witness: It will be noted from this statement that stations are being installed at a rate that will account for the equivalent of all stations in use in a period of approximately 3.75 years, and are being taken out at a rate that

will account for the equivalent of all stations in a period of 3.85 years.

Q. And the difference between those two figures represents your gain does it not?

A. That is right.

[fol. 9958] Q. I wish you would discuss for a moment the ascertained unit expenses for service connections.

A. The service connection expense can be divided into two general classes, first, the specific expense and, second, the indirect expense.

Q. Mr. Cooper, before you proceed with that I am going to ask you to identify, if you please, Exhibits 9, 10, 11 and 12 which contain a summary of the expenses which you are about to discuss for the four exchanges, namely, Cleveland, Columbus, Canton and Nelsonville, so that the gentlemen in the room may have them before them as you discuss the subject.

A. Exhibits 9, 10, 11 and 12 show these direct expenses for Cleveland, Columbus, Canton and Nelsonville respectively, based on the study and analysis that I will be glad to explain.

Mr. Burr: Cooper Exhibits 9, 10, 11 and 12 are offered in evidence.

And thereupon the statements last above referred to are admitted in evidence on behalf of The Ohio Bell Telephone Company and are herewith submitted and marked respectively Cooper Exhibits 9, 10, 11 and 12.

The Witness: The specific expense shown on these Exhibits are the non-capitalized items of expense in the different departments of the Company incident to the handling of an order from the time the original application [fol. 9959] for service is made until service is established, following through to the completion of the work occasioned by the discontinuance of the service but not including the expense of any of the items of regular service furnished to the subscriber while his station is connected and in use. These costs are based on detailed studies that have been made for each department of the Company in each of these four exchanges and cover the minimum specific expenses.

Certain other items should be added to those amounts to get the total expense but in this analysis we have eliminated

all other than the direct items of expense that we could pick out and ascertain accurately.

Exhibit No. 9 for Cleveland shows a total service connection cost under No. 1 for instruments not in place; main stations and P. B. X. trunks of $15.90. That includes the average amount of wiring loss per station discontinued and removed for Cleveland, which will be explained in the next statement.

For instruments in place that cost was $19.07.

Q. Why is the cost lower in the case of instruments not in place than instruments in place?

A. In the case of Cleveland it is just the other way, Mr. Burr; it is more for instruments in place than it is for instruments not in place, due to the fact that where instruments are not in place a part of the plant operation—plant work in the first case is chargeable to the capital account. But if the instrument is in place the work necessary to be done by the plant department in re-connecting the service [fol. 9960] is charged to the expense account.

Q. I see. I have already offered your Exhibits 9, 10, 11 and 12 inclusive in evidence, but before leaving that, Mr. Cooper, I would like to ask where is the data—or perhaps where are the data is more grammatical—showing the costs which you have tabulated in these four Exhibits.

A. I brought with me some of the summaries involved in the making of this study in these binders. There is some of the data. The fundamental data on which these costs are based is not included here.

Q. And those four inches of pages you hold in your left hand represent a part of the data from which those costs were compiled?

A. That is right.

Mr. Burr: And anybody may examine these sheets at their leisure.

Mr. Dotson: Mr. Cooper, why does the fact that the original installation cost, when it is charged to capital account, become less than the cost of installing the service where the instrument is in place when it is charged to expense account?

The Witness: These amounts shown on Exhibit No. 9 cover only the items that are not charged to capital account. Now in the case of a new installation a considerable part of the work done by the plant department is charged to the

capital account. For example the assignment of the line number, the cable conductor and the distribution of the equipment, the construction of the drop wire, the installation of the instrument and the running of the inside wire is all charged to the capital account. Now if the instru-
[fol. 9961] ment is in place, any work going with the re-installation or re-connection of that service must, under our uniform system of accounts, be charged to expense. And there is always some work of that kind to be done, in some cases more than others. But that work tends to increase the cost of the plant part of the operation as compared with the installation of a brand new service.

Mr. Dotson: Well, how does the cost where the instrument is in place compare with the amount that is charged to expense account in the original installation?

The Witness: I do not know that I understand you, Mr. Dotson.

(Question read.)

The Witness: It would be greater than in the original installation.

Mr. Dotson: It would?

The Witness: Yes, sir.

Mr. Dotson: Well, your statement does not show the item of expense that is charged to expense in the original installation does it?

The Witness: Yes, sir, it does.

Mr. Dotson: Where does that appear?

The Witness: In the case of Exhibit No. 9, instruments not in place, under Line 1, main stations and P. B. X. trunks would be a total of $5.19. Under "Establishing service" and under "Discontinuing service", $10.71. That total of $5.19 is made up——

Mr. Dotson: The total of $5.00 and $10.00 would consti-
[fol. 9962] tute the total expense of that station?

The Witness: Yes, for the original installation and for the subsequent discontinuance of service.

Mr. Dotson: Now, that expense is not as great then, however, as the amount you carry to the expense account when the instruments are in place?

The Witness: Yes, it would be greater than that amount on the average.

Mr. Dotson: I am using the figures here; the total of those two items would be $15.90, whereas in the case of in-

struments in place for main station and P. B. X. trunks would be $19.07. That is the figure I am using.

The Witness: Oh, I did not understand you. The cost is greater if the instruments are in place than if they are not in place, due to the fact that in re-installations and re-connections there is a certain amount of work necessary to be done in that case chargeable to expense, which in the original installation would be charged to capital.

Mr. Dotson: I see.

The Witness: These costs shown on these statements cover only those items of expense and do not include the cost charges.

Mr. Dotson: I understand.

By Mr. Burr:

Q. Mr. Cooper, we have been talking more or less about wiring loss. Will you explain to the Commission what that item is and in connection with your testimony I will ask you to identify Cooper Exhibit No. 13 which bears on that subject, so that it may be passed around prior to [fol. 9963] your testimony.

A. Exhibit No. 13 is a statement prepared to define wiring loss and to give the total amount of that loss for The Ohio Bell property for the five year period January 1917, to December 31st, 1921.

Mr. Burr: We offer in evidence Cooper Exhibit No. 13.

And thereupon the document last above referred to is admitted in evidence on behalf of The Ohio Bell Telephone Company and is herewith submitted and marked Cooper Exhibit No. 13.

The Witness: At the time a new installation is made, as has already been explained, the labor and material used by the plant department at the applicant's premises, are charged to a plant account, that is, are capitalized, and at the time are not expense. However, when the telephone is removed this item is credited to the plant account, so that capital at no time includes items for installation not actually in service. At the time of making this credit to capital, the salvaged part of the installation is charged to a material and supplies account, and the balance is charged to expense until such time as it is to be re-used. That part of the capitalized cost of a new installation, which cannot later

be salvaged, therefore, may be considered a deferred expense item. This expense or loss is represented largely by labor.

When telephones are re-installed, that is, when telephones [fol. 9964] are placed where old wiring is in place and usable, the value of the wiring in place, including the original labor involved, is credited to expense and charged to the proper plant account. The result is a constant succession of debits and credits to expense from this source, and the net balance during any given period, is the amount of realized expense out of the original total capitalized costs above referred to as deferred items of expense. The net amount of this expense divided by the number of removals during the period gives the average wiring loss per station removed, and is a separable item of expense clearly attributable to station movement.

Then follows a table showing the wiring loss for the territory of The Ohio Bell Telephone Company as operated by the former Cleveland Telephone Company and the Ohio Division of The Central Union Telephone Company.

Q. Suppose, Mr. Cooper, that you eliminated altogether any expense on account of wiring loss from your figures in calculating service connection charges and the expense incident to the movements covered by those charges, what would you say as to whether or not the service connection charges in the proposed telephones would or would not then be reasonable in your judgment?

A. Eliminating this item of wiring loss which amounts on the average to $3.03, the net costs of other items charged to expense would still be considerably in excess of the proposed charges for service connections.

Q. Have you prepared an Exhibit showing the effect of [fol. 9965] service connection charges, the Exhibit being a comparative statement showing the distribution of service connection expenses between stations of various lengths of life and the burdens and benefits caused and resulting therefrom?

A. Yes, sir, I have.

Mr. Burr: The Exhibit may be marked as Cooper Exhibit No. 14, and we offer it in evidence.

And thereupon the table last above referred to is admitted in evidence on behalf of The Ohio Bell Telephone

Company and is herewith submitted and marked Cooper Exhibit No. 14.

The Witness: It has already been shown that there is a very high rate of turn-over of stations and that the total expenses for service connections and disconnections, if distributed uniformly among all subscribers would lead to an unfair distribution of that expense. This table, which is computed from the actual experience in Columbus, is stations terminated between December 1st, 1920, and June 1st, 1921, using the average service connection expense for Columbus of $9.81, shows the effect of collecting all of that service connection expense through monthly rates and, second, the effect if a service connection charge of $4.00 were in effect. In Column A is shown various periods of service starting with three months and running down to eighteen and nineteen years to cover the stations that were analyzed.

[fol. 9966] Q. Where did you get those stations?

A. Those are residence stations in Columbus terminated from December 1st, 1920, to June 1st, 1921; the same data used in the previous Exhibits.

Q. That is what I wanted to bring out.

A. In Column B we have shown the distribution of those stations according to the length of life. For example, 146 were terminated within three months; 214 had a life from 3 to 6 months; 158 were from 6 to 9 months, and so on down to one station that was between 18 and 19 years in life. In Column C is shown the per cent corresponding to that number of stations on a non-cumulative basis, and in Column D on a cumulative basis.

Now in Columns E, f and G we have shown the effect if all service connection expense is collected through the monthly rates. The total service connection expense for those stations would amount to $15,676.38, and distributing that according to the life in months and years we find that the average amount collected through the monthly rates for the three months station would be 95 cents and for the station that lived from 18 to 19 years, $69.93.

Now, the average service connection expense is $9.81. So deducting those amounts from $9.81 we get, in Column F, the saving to the short term subscriber which starts at $8.86 for the three months subscribers and runs down to 36 cents for the two to three year subscriber, and in Column

G the penalty for the long term subscriber which starts with $3.42 for the three to four year subscriber and runs [fol. 9967] down to $60.12 for the man who has kept his service from 18 to 19 years.

Now in Columns H, I, J, K and L, we have shown the effect of collecting a $4.00 service connection charge and the balance of the service connection expense through the monthly rates. In Column H is shown the service connection charge of $4.00.

Column I then would be the amount collected through the monthly rates toward the service connection expense.

Column J would be the sum of the service connection charge and the payments through the monthly rates, and,

Column K we have the saving for the short term subscribers in the case of three months, $5.25, running down to 20 cents for the two to three year subscriber.

And the burden for the long term subscriber is in Column L.

This table shows clearly the effect of the $4.00 service connection charge in reducing that wide range and the saving to the short term subscriber and the burden to the long term subscriber.

Chairman Poor: Mr. Burr, how much more will you have?

Mr. Burr: We will not have very much more.

Chairman Poor: Do you gentlemen desire to cross examine this witness?

Mr. Leach: There is at least one question we want to know and that is the one asked Mr. Reed, the total income to be derived in the State of Ohio.

[fol. 9968] Chairman Poor: I just want to arrange it; we have gone beyond the hour of adjournment and it is just a question whether we can get through this evening.

Mr. Dotson: Well, now, if Your Honors please——

Chairman Poor: If it will just take a few minutes, all right, and if not we will recess until tomorrow morning.

Mr. Dotson: Well, Your Honors, if I may express here the view that I have of this matter, viewing it from my point, there has been introduced quite a mass of statistics and information evidently of considerable value, and great care has been given to it and attention and skill and by those who are thoroughly familiar with the subject under discussion, and personally I feel almost helpless in the

present subject in being able to conduct any intelligent cross examination or doing anything with it today.

This information also convinces me that we are dealing with basic and vital facts that have to do with the fixing of any and all rates for telephone service to a greater or less extent.

In other words, any time in the future that we are called upon to discuss and consider the general rates of service for users of phones we will have practically the same set of facts and the same line of information.

Now that being true it has occurred to me that if it can possibly be done with any degree of reasonableness, that we have a continuance of this hearing, say for four or six weeks, if possible, giving us all a chance to go over this [fol. 9969] evidence if we can be furnished with a copy of it and in that way we would shorten our process here. We could approach the matter probably a great deal more intelligently. I know that whatever part I expect to take in it I would be able to do expeditiously and to the point without any delay and without much wandering and rambling around. As it is today I cannot even do that because I do not know enough about this. And the only way I can arrive at any intelligent idea so as to serve my community in any degree of value whatever is to have an opportunity to go over these facts and figures. I presume the other gentlemen here are practically in the same position.

This is the first time I have ever been before this Commission and I do not know what your method of procedure is only what I have observed here today. I do not know what policy has been followed in the matter of continuances. But it seems to me that we are the only people, however, that are really put to any inconvenience on account of a continuance because we have to travel back home and back here again. I presume that the witnesses here today, if we desire to cross examine them would not be caused any great degree of trouble to be here again. I take it that the spirit of fairness and frankness is prevailing here among all parties and that is very commendable, and that ought to afford a greater reason why we should have this opportunity it seems to me.

Mr. Burr: We have not any objection to such an arrangement, Your Honors. I make this suggestion, that while [fol. 9970] the gentlemen on the other side, if they do not mind being termed as being on the other side, are con-

sidering the Exhibits and the testimony, the Commission's engineers might be doing the same thing with the idea that when we re-convene if they have any cross examination or questions which they care to ask, the questions may be forthcoming at that time. Also I suggest that if we may have 15 minutes more now we can close our case in chief and then gentlemen on the other side will have all of our case in chief to consider.

Mr. Dotson: That is why I spoke as I did.

Chairman Poor: It has been the custom of the Commission in the past, and we will adhere to it in this case, that where the Company is seeking something and using facts and figures which are completely within the power and control of the Company, that upon request of any protestant or anyone contesting the application, to give a reasonable time to study any evidence or facts that have been presented. And we will pursue that policy at this time. However, I just wondered whether before you do leave and go away, if you wanted to go into any extensive examination of this witness to clear up matters in your own mind that would help you while you are gone in studying the Exhibits and all that, we would allow you to do that before you state at this time, but, however, not tonight. That was the point of my question. We have reserved two days for this hearing. And as a matter of fact this Commission sometimes does something else besides sit down in this hearing room and if we sit down here all day long we do [fol. 9971] not get up for anything else, and my object was to see whether we should adjourn permanently tonight to a future date or proceed tomorrow.

Mr. Dotson: I would rather adjourn permanently to the next date.

Chairman Poor: Then we will go on with the understanding that the Company will be allowed 15 minutes to complete its case and there will be no cross examination and we will adjourn to a further date.

By Mr. Burr:

Q. Calling your attention next to Exhibit No. 15, please tell the Commission briefly what that Exhibit shows.

A. Exhibit No. 15 is a statement that is prepared to show in simple form a comparison of the monthly charges for service for short and long term subscribers under a rate system which does not include service connection charges.

The table is based on the same cost and rates for Columbus, namely $9.81 service connection expense and $3.75 monthly rate for individual residence line service, and shows a discrimination if no specific charge is made for service connection.

On the first line we have shown the monthly exchange rate, on the second line the expense for service connection, which is $9.81 divided by the number of months the service is retained, which varies from $3.27 per month for the three months subscriber to 41 cents for the 24 months subscribers. On the next line is the balance representing the sum paid per month for regular monthly service rendered, varying from 48 cents per month for the three months subscribers to [fol. 9972] $3.34 per month for the 24 months subscriber.

Mr. Burr: I now offer Cooper Exhibit No. 15 in evidence.

And thereupon the statement last above referred to is admitted in evidence on behalf of The Ohio Bell Telephone Company and is herewith submitted and marked Cooper Exhibit No. 15.

Q. Can these discriminations be eliminated by imposing service connection charges and to what extent?

A. That discrimination can only be entirely eliminated by imposing a service connection charge equal to the service connection expense but it can be materially reduced by imposing a service connection charge such as planned at this time. Another simple form of statement has been prepared to show the effect with the $4.00 service connection charge proposed for Columbus.

Q. That is Cooper Exhibit No. 16?

A. Yes, sir.

Mr. Burr: We offer Cooper Exhibit No. 16 in evidence.

And thereupon the statement last above referred to is admitted in evidence on behalf of The Ohio Bell Telephone Company and is herewith submitted and marked Cooper Exhibit No. 16.

[fol. 9973] Q. You may explain Cooper Exhibit No. 16.

A. That table is similar to the one Exhibit No. 15, and shows in the last line that with the service connection charge of $4.00 in effect that the total charge per month for service and service connection will vary for a three months subscriber from $5.08 to $3.92 for the 24 months subscriber. In that case there is a proper relation between the charges for

short term service and for long term service, and the amount of protection afforded the long term subscriber is clearly illustrated.

Q. I wish you would discuss briefly the subject of moves and changes.

A. Under the rate systems where there is no charge at all made for moves and changes it has been found that there is a tendency to have moving and changing of equipment done entirely without any consideration as to the cost incurred by the Company; that a slight preference as to the location of the instruments or convenience of a decorator or other similar items would lead to requests for the moving of equipment which would cost the Company considerable money and in the end that cost must be met by revenue from subscribers and so be reflected in the higher level of rates. The present charges for moving stations are $1.00 from one location to another in the same room, $1.50 from one room to another on the same floor and $2.00 from one floor to another in the same building.

An analysis of 3,542 orders for moves in The Ohio Bell Telephone Company discloses a total cost for this work of $26,642.00 or $7.52 per move. For those moves we obtained [fol. 9974] under the present charges an average revenue of $1.50. Applying to those orders the rates proposed under the schedules now on file the total revenue to be derived would be $3.52 per order, still leaving the revenue to the Company considerably less than the actual cost to the Company for handling that work.

Q. Why are you not proposing to make them as high as the actual cost?

A. Charges for moves and changes must necessarily be not in excess of the service connection charge for a similar service. If they were on the basis of actual cost or in excess of the service connection charge, any subscriber could order his service discontinued and immediately apply for a reinstallation under the service connection charge. For that reason it is not proposed to make this charge higher than the service connection charge.

Q. In the limited time we have left, Mr. Cooper, will you discuss for a moment the purpose of the restoral of service charges?

A. The restoral of service charge is proposed solely as a collection measure and as an aid to us in collecting accounts